Topics in the Phonology and Morphology
of San Francisco del Mar Huave

by

Yuni Kim

A.B. (Harvard University) 2002
M.A. (University of California, Berkeley) 2005

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Linguistics

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Sharon Inkelas, Chair
Professor Andrew Garrett
Professor Larry Hyman
Professor Johanna Nichols

Fall 2008

Topics in the Phonology and Morphology of San Francisco del Mar Huave

by Yuni Kim

Abstract

Topics in the Phonology and Morphology of San Francisco del Mar Huave

by

Yuni Kim

Doctor of Philosophy in Linguistics

University of California, Berkeley

Professor Sharon Inkelas, Chair

This dissertation is a study of the phonology and morphology of the Huave language as spoken in San Francisco del Mar, Oaxaca State, Mexico. Huave is a language isolate, and the San Francisco del Mar dialect (one of four) is severely endangered, with almost all of its approximately 100 remaining fluent speakers over 65 years of age. The present study represents the first in-depth linguistic research on this dialect and is based on the author's fieldwork in the village.

The dissertation starts with a typological and sociolinguistic overview of Huave (Chapter 1). It then provides an analytical description of all phonological phenomena encountered in research to date (Chapter 2), paying special attention to the distribution and realization of palatalization, and to the fusion, dissimilation, and contextual deletion processes associated with glottal fricatives. The following chapters develop detailed and theoretically-oriented treatments of specific phonological phenomena. Chapter 3 proposes a unified analysis of various diphthongization processes and relates them to the realization of consonant palatalization, while also elaborating on the subsegmental

representations of vowels and consonants. In Chapter 4, Correspondence theory is used to analyze unusual patterns of copy and blocking in the vowel harmony system.

Chapter 5 gives a morphological overview of Huave word classes and basic morphological structure. Chapter 6 focuses on verbal morphology, including verbal person, number, and tense/aspect inflection, and a diverse array of valence alternations. Finally, Chapter 7 provides a comprehensive picture of verbal affix ordering, which is complicated by “mobile affixes” that surface as prefixes or suffixes depending on context. The abstract hierarchical structure of the verb is worked out, and the linear placement of mobile affixes within these hierarchical constraints is argued to be phonologically conditioned.

Table of Contents

Abbreviations

1	First person
1POS1	First person possessive, Class 1
1POS2	First person possessive, Class 2
1POS	First person possessive, Class 3
1SB	First person subordinate
2	Second person
2I	Second person intransitive
2POS1	Second person possessive, Class 1
2POS2	Second person possessive, Class 2
3PL	Third-person plural
CAUS	Causative
CF	Counterfactual
CP	Completive
D	Determiner
DM	Diminutive
DUR	Durative
EX	Exclusive
FT	Future
G	Gerund
INC	First-person inclusive
ITR	Intransitive
LOC	Locative particle
MI	*mi*/*me* particle
MOT	Motion particle
N	Pronoun builder
P	Personal determiner
PASS	Passive
PF	Perfect
PL	Plural
POS	Possessive, Class 3
POS1	Possessive, Class 1
POS2	Possessive, Class 2
PROG	Progressive
QUOT	Quotative particle
RED	Reduplicated form
REL	Relativizer
RF	Reflexive
SB	Subordinate
ST	Stative
TV	Theme vowel
V	Suffix or prefix vowel

Abbreviations

1	First person
1POS1	First person possessive, Class 1
1POS2	First person possessive, Class 2
1POS	First person possessive, Class 3
1SB	First person subordinate
2	Second person
2I	Second person intransitive
2POS1	Second person possessive, Class 1
2POS2	Second person possessive, Class 2
3PL	Third-person plural
CAUS	Causative
CF	Counterfactual
CP	Completive
D	Determiner
DM	Diminutive
DUR	Durative
EX	Exclusive
FT	Future
G	Gerund
INC	First-person inclusive
ITR	Intransitive
LOC	Locative particle
MI	*mi*/*me* particle
MOT	Motion particle
N	Pronoun builder
P	Personal determiner
PASS	Passive
PF	Perfect
PL	Plural
POS	Possessive, Class 3
POS1	Possessive, Class 1
POS2	Possessive, Class 2
PROG	Progressive
QUOT	Quotative particle
RED	Reduplicated form
REL	Relativizer
RF	Reflexive
SB	Subordinate
ST	Stative
TV	Theme vowel
V	Suffix or prefix vowel

Acknowledgments

I am fortunate to be able to thank many teachers, friends, and colleagues for their help and support in the various stages of writing this dissertation.

I would like to start by expressing my deepest appreciation to the Huave people of San Francisco del Mar, Oaxaca, Mexico, who have graciously and generously hosted me, helped me adapt to a new environment, and assisted me in my efforts to learn about their language. I thank them for their ongoing friendship, and for the trust, confidence, and enthusiasm with which they welcomed me, a complete stranger, into their homes and lives. In particular I am grateful for the hospitality of Leonel Gómez Cruz and his entire extended family as well as neighbors, who have gone out of their way to make my visits as comfortable and enjoyable as possible. And, of course, this research would not have been possible without all the people who have generously shared their time and knowledge of the Huave language with me: B. Gómez Vargas, E. Martínez Martínez, S. Juan Nieto, M. Mendoza Castillo, B. Francisco, F. Gómez, I. Antonio, P. Martínez José, M. Vicente Ruiz, B. Nieto Martínez, A. Enríquez Martínez, T. Juan Cortez, R. Enríquez Morales, J. Juan Nieto, L. Juan Ruiz, L. Jiménez Mendoza, I. Pérez Martínez, A. Juan Francisco, I. Juan Francisco, A. Gómez Vargas, T. Gómez Vargas, F. Martínez Martínez, F. Enríquez Martínez, G. Carreño Cortez, J. Enríquez Nieto, R. Pedro Martínez, V. Francisco Gómez, and others. I am immensely grateful to these teachers and hope that my rendering of their words on the following pages has done some justice to their lessons.

At Berkeley, I have been extremely fortunate to have Sharon Inkelas as my advisor. It is hard to express how much I have learned from her, and how much I have benefited from being pushed to expand in new directions outside my preexisting intellectual comfort zone. I would like to thank her for many enlightening discussions, insightful comments on my work, and all her advice and guidance. It has also been a privilege to work with Larry Hyman, from whom I have learned a great deal about things tonal and not. Both he and Andrew Garrett have had a deep influence on my thinking about linguistics and philosophy of research, in one-on-one conversations as well as in group settings in the department. I would like to express my thanks to them, and to Johanna Nichols, my fourth committee member, for all their help with my work. In addition, I would like to thank Keith Johnson, Leanne Hinton, John Ohala, Ian Maddieson, Juliette Blevins, Lynn Nichols, Gary Holland, Alice Gaby, and the rest of the Berkeley faculty for their contributions to my graduate education. Belén Flores, Ron Sprouse, Paula Floro, and the other department staff have also been enormously helpful and made our department a pleasant and positive place to work.

I would not have ended up at Berkeley, or perhaps doing linguistics at all, if not for Bert Vaux, my undergraduate advisor at Harvard whose influence on me is still evident throughout this thesis. Thanks also to Lisa Lavoie, whose class first made me realize I wanted to do phonology; Jay Jasanoff; and my other linguistics teachers at Harvard, who sent me off to graduate school well prepared. Going further back in time, I would like to acknowledge my Spanish teachers at the Lawrenceville School (Ms. Stewart y Fonseca, Mr. Brink, Ms. Giménez, Mr. Martí, Mr. Torres), without whose instruction my recent fieldwork would have been impossible. And, jumping ahead again, I thank Jan-Ola Östman, Camilla Wide, Caroline Sandström, and other Finland-

Swedish dialectology colleagues at the University of Helsinki for my first real fieldwork experiences, without which my recent fieldwork would have gone much less smoothly.

Parts of this research were presented at the 2006 LSA Meeting (Albuquerque), 2007 and 2008 SSILA Annual Meetings (Anaheim/Chicago), the 15th Manchester Phonology Meeting (2007), the 13th International Morphology Meeting (Vienna 2008), and the 18th International Congress of Linguists (Seoul 2008). I am grateful to the audiences at these conferences for their comments, not all of which I have been able to incorporate fully, but many of which I hope to explore further in the future. This work has also benefited from the input of participants in the Berkeley Phonology Forum, Stanford Phonology Workshop, and various presentation opportunities at Berkeley.

Funding for my graduate studies was provided in 2003-04 by a fellowship from the Berkeley Linguistics Department, from 2004 to 2006 by a Jacob K. Javits Graduate Fellowship, and from 2006 to 2008 by a National Science Foundation Graduate Fellowship. My fieldwork was sponsored by Richard Diebold's Salus Mundi Foundation via the Huave Language and Culture Project. I would like to thank Principal Investigators Maurizio Gnerre and Bill Hanks for giving me the opportunity to participate in this project, which has been extremely enriching both intellectually and personally. Maurizio took me into the field on my initial trip, setting me up in San Francisco del Mar; his encouragement, as well as that of Bill Hanks and Flavia Cuturi, has been greatly appreciated. Rolf Noyer, besides being excellent company in the field, has been generous in sharing resources and knowledge about Huave. The enormous amount he has figured out about the structure of Huave, based on descriptive primary sources, enabled my research to start from a considerably more advanced point than would otherwise have been possible.

On a more personal note, I am happy to have had friends and colleagues over the past few years whose company has made graduate school an enjoyable time for much of the time, and a tolerable time at times when it was less enjoyable. I would like to thank them (in no particular order) for good times and many interesting discussions, linguistic and otherwise: my intellectual siblings Mary Paster, David Mortensen, Anne Pycha, and Russell Rhodes; fellow Mesoamerican fieldworkers Gabriela Caballero, Rosemary Beam de Azcona, Teresa McFarland, and Christian DiCanio; Mischa Park-Doob and Sam Tilsen, with whom I shared adventures the first summer in Huaveland; other members of my cohort, Rebecca Cover, Nicole Marcus, Reiko Kataoka, and Lisa Bennett; my officemates, including Thera Crane, Wesley Leonard, Ruth Rouvier, Jenny Lederer, Michael Houser, and Maziar Toosarvandani; Michael Marlo, who I talked to as often as to anyone in Berkeley; and Charles Chang, Yao Yao, Iksoo Kwon, and all my other fellow graduate students in Berkeley Linguistics. I am also grateful to my house- and apartment-mates Grant Kauwe, Josh Tasoff, Yassi Hafezi, and Raymundo Campos Vázquez; friends from International House and the RAD Lab; and my other non-linguist friends for their moral support during the researching and writing of this thesis.

Finally, I am grateful most of all for the constant love and support of my parents, Yongcheol and Soonae Kim, and my brother Gil. My parents have made numerous sacrifices over the years for the sake of my education, and they have always encouraged my interest in linguistics and supported me in whatever I wanted to do.

Chapter 1

Introduction

1.1 Preface

This dissertation presents a study of the phonology and morphology of the Huave language as spoken in San Francisco del Mar, Oaxaca State, Mexico. Huave is an isolate spoken by approximately 10-15,000 people in the four towns of Oaxaca's *Zona Huave*, each of which has its own distinct variety of the language: San Francisco del Mar, San Mateo del Mar, San Dionisio del Mar, and Santa María del Mar. The San Francisco del Mar variety is spoken fluently only by a subset of the town's elderly residents. As of 2008 there are no monolinguals in a population of over 5,000, and probably not more than 100 individuals total with a high degree of fluency in Huave. Only the San Mateo del Mar variety is still being actively acquired by children, and it is also the only one that has been documented in any depth in the linguistic literature. It is therefore hoped that the present study, based on the author's fieldwork in San Francisco del Mar, will contribute to the understanding of Huave linguistics in general, while also making known some unique characteristics of a dialect that may cease to be spoken in a not too distant future.

The organization of the dissertation is intended to support these overlapping but (in my view) not entirely isomorphic goals of language documentation on the one hand, and on the other, theoretical-linguistic analysis of specific phenomena in Huave (to enable a deeper understanding of them in their own right as well as in how they might relate to cross-linguistic typology and general human cognitive mechanisms for language structure). Chapter 2 is an overview of the phonology, which is followed by more in-depth treatments of specific phonological issues: Chapter 3 on diphthongization and Chapter 4 on vowel harmony. Chapter 5, on word classes, and Chapter 6, on verbal morphology, delineate the basic features of Huave word structure. They are fairly exhaustive with respect to my investigations to date, even as they only scratch the surface of the language itself; future research is certain to uncover additional generalizations and phenomena of interest. Finally, Chapter 7 analyzes verbal affix order and the phenomenon of mobile affixation. The topics in Chapters 3, 4 and 7 were selected for the cross-linguistic uniqueness of their Huave manifestations and consequent potential for theoretical contribution, as much as for their centrality in Huave grammar - it is not too great an exaggeration to say that one can barely utter a verb form without mastery of the principles behind all three subsystems.

In the remainder of this brief introduction I will discuss the sociolinguistics of Huave, and the San Francisco del Mar dialect in particular; provide information about my fieldwork and data collection; give an overview of previous research on Huave; discuss some typological features and other linguistically notable aspects of Huave, including differences between the San Francisco del Mar variety and the better-known one of San Mateo del Mar; and finally, present the segment inventory and the orthographical conventions that will be used throughout the dissertation.

1.2 Sociolinguistic background

The four towns of the *Zona Huave* are located on the Pacific Coast of Oaxaca's Isthmus (*Istmo*) region near the cities of Salina Cruz and Juchitán, on three peninsulas stretching into the Gulf of Tehuantepec. The Huaves thus occupy a maritime zone, surrounded on land entirely by Spanish and Isthmus Zapotec-speaking areas, with much inter-village contact traditionally taking place over the water. Huaves are primarily fishermen, although the future of the traditional livelihood and societal structure currently hangs in the balance as recent, rapid changes associated with globalization and modernization continue to develop and play themselves out.

The division of Huave into four dialects probably does not date further back than the 16th century, to the establishment of the towns post-Conquest following demographic upheaval caused by wars and epidemics (Signorini 1979, Millán 2003). This gives the dialects a time depth of less than 500 years with fairly consistent contact, so they have enough similarities with each other that much of what we may eventually know about the history of the Huave language will result from internal rather than comparative reconstruction. Nevertheless, judging from the reports of San Francisco del Mar speakers, reliable mutual intelligibility with San Mateo del Mar requires significant exposure. The main comprehension difficulties are introduced by vowel shifts, vocabulary differences, and prosodic differences. The difference is perhaps comparable to that between standard spoken Swedish and standard spoken Danish. The San Dionisio del Mar dialect is most similar to San Mateo, while the Santa María del Mar dialect bears the most affinities to San Francisco (although its geographical proximity to San Mateo has resulted in influence from that dialect as well).

In pre-colonial times, the Huaves had contact with Mixes, Zoques, Mixtecs, and other ethnic groups moving through the Isthmus region (Signorini 1979:23ff., Millán 2003). In colonial and more recent times, the Zapotec presence has been increasingly significant. While Isthmus Zapotec is widely spoken in the region, only a couple of the San Francisco del Mar Huave speakers I have worked with can speak more than basic Zapotec. It is possible that there was more Huave-Zapotec bilingualism in previous generations, as Zapotec is also on the retreat in the towns closest to San Francisco del Mar (despite its continued strong presence in the city of Juchitán).

The 2000 census gives the following population statistics for the Huave *municipios*: 9,230 residents in San Mateo del Mar, 5,001 in San Francisco del Mar, and 4,325 in San Dionisio del Mar. The *pueblo* of Santa María del Mar belongs administratively to Juchitán and has fewer than 1,000 residents. In San Mateo del Mar, the Huave language is spoken actively in everyday life by all generations. In San Dionisio del Mar, many adults are bilingual in Huave and Spanish, though younger adults tend to be Spanish-dominant and youth/teenagers seem to have more passive than active competence in the language. The situation in Santa María del Mar is unknown to me, but anecdotal sources indicate that the language there is more endangered than in San Dionisio, and very probably much more so.

The San Francisco del Mar dialect is severely endangered; Spanish is the language of public and most private life in town. I know of no monolingual Huave speakers at all, and all Huave-dominant bilinguals are well over 60 years of age. According to speakers I worked with, who were adolescents at the time, transmission began to cease in the early 1930s with the arrival of schoolteachers who instructed parents to speak only Spanish with their children and hit children as punishment for speaking Huave. Some children from this era remained monolingual or heavily Huave-dominant into early adulthood, but as Spanish gained more of a foothold in town (for example among younger siblings and relatives), they all ended up using significant amounts of Spanish in daily life - even, depending on their life circumstances, to the near-exclusion of Huave.

Thus people born as early as 1925 are often Spanish-dominant, and many who grew up speaking Huave have not used it in years, for instance since their parents passed away, especially if their spouses are not also fluent. As for younger residents, many currently over 40 have varying degrees of passive knowledge of Huave: some understand very well, having grown up around parents and older relatives who spoke Huave with each other, while others grew up in entirely Spanish-speaking households and may only recognize a few words of Huave. Very few residents under the age of 40 know more than a few words of Huave, although there is some interest in learning. A handful of younger people have managed to attain some conversational competence by apprenticing themselves to elders, and a group of young cultural preservation activists recently compiled and printed a phrasebook for distribution in the community.

Because of these varying degrees and types of competence it is hard to estimate a number of "speakers," but the number of reasonably fluent speakers can hardly be more than 100. In 1940 the population was counted as 1,622 (Millán 2003), so the subset of that population that were children at the time (not all of whom are still alive) would form an approximate upper limit on the number of speakers of all levels of active competence. Personally, I have either met or have reliable reports of about 60 fluent speakers of the San Francisco dialect. As can be expected in this type of situation, there is appreciable variation, which will be alluded to where relevant.

In their own language, the Huaves self-designate using the inclusive 'we' of their respective dialects: *kunajts* in San Francisco and *ikoots* in San Mateo, for example, and in Spanish they call themselves *mareños*. The term *huaves* is also used but some people disprefer it. The word *huave* is widely reported to come from a Zapotec term meaning 'people who rot in the humidity.' Their name for their language translates to 'our mouth' (inclusive): *umbeyajts* in San Francisco and *ombeayiiüts* in San Mateo. In Spanish they refer to their language sometimes as *huave*, but more often as simply *idioma* or *dialecto*.

1.3 Fieldwork and data sources

The San Francisco del Mar data presented in the dissertation come exclusively from my fieldnotes, and examples are cited in the form (Notebook number; Page number) or by reference to the name of a sound file or text.[1] Data were gathered over five visits totaling 14 weeks of fieldwork in San Francisco del Mar. My principal consultants are a man born in 1917 and a woman born in 1922. I have also worked to varying degrees with about 15 other speakers, all born in the 1920s and 1930s and about evenly split between men and women; many of their words are also cited here.

A significant amount of the data cited comes from elicitation sessions with Spanish as the contact language. These include translations of Spanish words, phrases, and sentences; responses to Spanish prompts (e.g. "What would be said in situation X?"); words, phrases, and sentences volunteered by speakers in relation to topics being discussed; and monologic texts collected in response to requests to record stories in

[1] Copies of these materials are being prepared for archiving in the Survey of California and Other Indian Languages and the Berkeley Language Center at UC Berkeley.

Huave. A major goal, however, has been to move towards monolingual fieldwork, in order to observe language that is more naturally and spontaneously produced, and which can be understood as part of a wider pragmatic and interactional context. Thus much of the data cited also comes from conversations in Huave between a speaker and myself, including comments and questions addressed to me in Huave, responses to questions asked in Huave, and stories told spontaneously in Huave in the format of extended conversational turns. I have interacted with almost all of my consultants in both Spanish and Huave. With the main male consultant I have used somewhat more Spanish than Huave, due to the high proportion of elicitation work, and with the main female consultant the recent balance is perhaps about evenly split. With others I have used anywhere from mostly Spanish to exclusively Huave, depending on the stage of my research at which I worked with them.

It has usually not been possible to work with more than one speaker at a time, or to otherwise observe interaction between two or more native speakers. Although the documentation and study of such interaction is a priority in my ongoing fieldwork, this type of data is unfortunately underrepresented here.

1.4 Previous research on Huave

This thesis is the first linguistic work to attempt either a comprehensive overview or close analysis of any aspects of the San Francisco del Mar dialect. The main previous source of information on the San Francisco del Mar dialect is the valuable comparative study of Suárez (1975), which includes basic lexical, phonological and morphological data on all four Huave varieties. Suárez (1975) is still essentially the only source on the Santa María del Mar dialect, and the San Dionisio del Mar dialect is only otherwise documented in the texts published by Radin (1929).

More materials are available on the San Mateo del Mar dialect, most notably the dictionary by Stairs & Stairs (1981) and the grammar, focusing on morphological description, by Stairs & Hollenbach (1981), published as a single volume by the Summer Institute of Linguistics. This work was preceded by Warkentin & Warkentin (1952), as well as older, more preliminary studies and wordlists such as Brasseur de Bourbourg (1861) and Belmar (1901). Secondary literature on the phonology of the San Mateo del Mar dialect includes work on prosody by Pike & Warkentin (1961), Noyer (1991), Pak (2007) and Evanini (2007); work on loanword phonology by Davidson & Noyer (1997); and the groundbreaking manuscript by Noyer (2003), which gives an overview and analysis of San Mateo phonology within a generative framework. Secondary literature on the morphology of the San Mateo del Mar dialect includes Stairs & Hollenbach (1969), Matthews (1972), Noyer (1993), and Cuturi & Gnerre (2005). Diebold (1961) is a sociolinguistic study of bilingualism in San Mateo del Mar, and recent anthropological-linguistic work has been carried out by Flavia Cuturi and Maurizio Gnerre (see e.g. Cuturi 2000). Chapter 2 of this thesis owes a particular debt to Noyer (2003), and Chapter 6 to Stairs & Hollenbach (1981).

There have been attempts to relate Huave to Mixe-Zoquean, Mayan and Totonacan languages (Radin 1916, 1924) and to Oto-Manguean (Swadesh 1960), but without convincing comparative evidence for these proposed relationships. Most modern reference sources (e.g. Campbell 1997:161) consider Huave to be an isolate.

1.5 Typological characteristics of San Francisco del Mar Huave

The basic word orders in Huave are VOS and SVO, with many of the constituent orders that typically accompany VO order (Greenberg 1963): adpositions preceding nouns (prepositions), possessed nouns preceding possessors in noun phrases, nouns preceding relative clauses, and sentence-initial question words; on the other hand, modifying adjectives precede head nouns. Single arguments of verbs can either precede or follow the verb, and left-adjunction topicalization of arguments is common.

Huave can be considered a head-marking language. Argument structure is indexed on the verb, possession is marked on head nouns in noun phrases, and plurality is marked on determiners rather than nouns in determiner phrases. Huave uses both prefixes and suffixes, along with some rather unique "mobile affixes" (discussed in chapter 6) that surface as either prefixes or suffixes depending on the phonological context. There is one infix, and two morphemes that I analyze as floating autosegments.

Word classes include verbs, nouns, adjectives, and function words, which are distinguishable in their essential aspects on various morphosyntactic grounds discussed in Chapter 5. Nevertheless, stative morphology (§6.3.7), shared person/number inflectional markers, and the relative flexibility in what types of words can function predicatively (among other things) create areas of overlap between the word classes. One example is that many attributive modifiers corresponding to English and Spanish adjectives are in fact statives of inchoative roots (§5.2). The person/number categories distinguished throughout the language are first, second, and third-person singular and plural. First-person inclusive is a "fourth person" with a now-collapsed distinction between dual and plural that corresponds to two distinct but apparently interchangeable morphological forms. The first-person inclusive does not share any person-marking morphology with the first-person exclusive.

Huave is somewhat of an agglutinating language. Some abstract inflectional categories of person, number, and tense/aspect have dedicated markers, while some affixes express combinations of these properties, and in other cases the absence of overt inflection for a certain category or combination of categories is its own marker. Stairs & Hollenbach's (1969) tagmemic, Item-and-Arrangement style approach to Huave verbal morphology reflects the agglutinative properties of the language insofar as they exist, while Matthews's (1972) reanalysis of their data lays out a signficant number of problems, pointing out ways in which Huave is perhaps more amenable to a Word-and-Paradigm type of analysis. Affix order (Chapter 7) is largely morphologically idiosyncratic, with no clear division between e.g. derivational and inflectional morphological positions.

The main feature of nominal morphology is a division into three noun classes (two closed, one productive) which are associated with different patterns of possessive marking. The San Francisco del Mar dialect of Huave has no case system (save for a marginal genitive; §5.3.4), but there is a rich system of determiner particles (§5.4.2).

Aside from the aforementioned person/number marking, the verbal system is characterized by bound roots that can be marked for three morphologically simple tenses/aspects (atemporal, completive, stative), two non-finite categories (subordinate and gerundive), and various complex tenses/aspects that are built either exclusively on the subordinate (future, durative) or in a transitivity-dependent way on either the subordinate or the atemporal (progressive, perfect). While transitives are distinguished from intransitives in this last group of tenses/aspects, there is split intransitivity elsewhere in the verbal system: transitive and unergative verbs are united under the category of “prefixing” roots, with unaccusatives forming a separate group of “suffixing” roots (§6.1.1). Most derivational morphology revolves around valence alternations one way or another; for example, there are at least five productive and non-productive morphological strategies for passivization/impersonalization (§6.4).

A few words can be said about typological characteristics of San Francisco del Mar phonology. As in the San Mateo del Mar dialect (Noyer 2003), the basic distinction in the consonant inventory is between the plain and palatalized consonant series (with contrastive palatalization only morpheme-finally), and surface diphthongization processes cue the plain vs. palatalized status of final consonants. Unlike the San Mateo del Mar dialect, there is no lexical tone or robust vowel length distinction, and there are five vowel phonemes as opposed to San Mateo’s underlying six. The San Mateo vowel length distinction corresponds to San Francisco vowel aspiration.

Diphthongization and vowel harmony exist in both dialects, although the actual patterns (comparing my data with Noyer’s 2003 synthesis of Stairs & Hollenbach’s description) are somewhat different. In Chapter 3 I propose a unified analysis of the various diphthongization processes, and discuss implications of the fact that both plainness and palatality (i.e. unmarked and marked members of the opposition) appear to be phonologically active. Chapter 4 analyzes the unique patterns of copy and blocking in Huave vowel harmony that have not (to my knowledge) been attested in other languages, although they have formal parallels in reduplication. I suggest that the

Huave pattern supports a string-internal correspondence approach to long-distance phonological interactions, as opposed to traditional autosegmental spreading.

The San Francisco dialect has a range of typologically unusual processes relating to vowel aspiration (§2.5) that are not found in San Mateo, due to the latter dialect's lack of contrastive aspiration. These include fusion with adjacent glides to create derived voiceless fricatives, dissimilatory deletion of aspiration following a [+spread glottis] segment anywhere in a preceding syllable-length window (a sort of reverse Grassmann's Law), variable weakening/deletion apparently conditioned by metrical and segmental context, and deletion before voiced codas. Another unique feature of San Francisco phonology is the deletion of various word-final segments and subsegments, not all of which are deleted in San Mateo: the stop phase of prenasalized stops, consonants after aspirated vowels, and glides homorganic with their preceding vowel.

As for morphology, while there are numerous small differences in both structure and substance between the San Francisco del Mar and San Mateo del Mar dialects, the basic outlines at the level discussed in this typological-overview section are very similar. Some of the more significant differences are San Francisco's loss of the dual/plural distinction in the first-person inclusive, its entirely different future prefixes (San Mateo *ap-* used in non-first person only vs. San Francisco *i-* used in all persons), the apparent absence of the San Francisco gerund category in San Mateo, and the absence of some San Mateo affixes in San Francisco such as the dubitative *ko-* and augmentative *an(ka)-*.

Other differences between Stairs & Hollenbach (1981) and my Chapters 5 and 6 have to do with my reanalyses of categories that are common to both dialects, which could potentially also apply to the San Mateo dialect. For example, their past tense is my completive aspect; their future tense is called by the same name here but additional properties are pointed out; and their "recent past" tense is what I refer to as perfect aspect. Much research on the tense/aspect system remains to be done, but the problematization of the categories is hoped to represent at least a start. I also do not have anything corresponding to their category of participles, since at least in San Francisco all such forms appear to represent specific syntactic uses (e.g. zero relatives) of independently attested verb forms, rather than a separate morphosyntactic category.

The prior existence of the descriptive work by Stairs & Hollenbach (1981) has provided an advantaged starting point for research on the San Franciscco del Mar dialect, permitting Chapters 5 and 6 to go somewhat beyond description into more detailed analysis than what would otherwise be possible of various morphological topics. Perhaps the most significant novel morphological result in this thesis is a relatively comprehensive picture of affix order, which is argued in Chapter 7 to have both morphological and phonological components. Previously, there has been virtually no work on the relative hierarchical position of any of the Huave affixes; this is perhaps due to the fact that affix mobility, where affixes can occupy different linear positions in different words, complicates the issue. The proposed hierarchical layer model integrates mobile affixes into a general ordering schema for all verbal affixes for which there is ordering evidence, capturing the fact that mobile affixes surface at a consistent distance from the root relative to other affixes regardless of whether they are prefixes or suffixes.

The prefixal vs. suffixal linear position of a mobile affix in any given instance is then conditioned by phonology (an analysis that takes Noyer 1993 as a starting point).

In sum, the unique morphological and phonological characteristics of Huave in general - and the San Francisco del Mar dialect in particular - mean that further study of these understudied language varieties (as with understudied languages in general) should, aside from having inherent documentary value, have much to contribute to cross-linguistic research.

1.6 Orthographical conventions

I now move on to a presentation of the orthography that will be used in the following chapters. The plain consonant inventory is shown in (1.1). The chart shows the orthography, and where the orthographic symbol differs from IPA, the IPA is given in brackets.

(1.1) Plain consonant inventory

	Labial	Coronal	Velar	Labiovelar	Glottal
Stops	p mb	t nd	k ng[ŋg]	kw ngw[ŋgw]	
Affricates		ts nts			
Fricatives	f[ɸ]	s			j[h]
Nasals	m	n			
Laterals		l			
Rhotics		r[ɾ] rr[r]			
Glides	w	y[j]			

The palatalized consonant inventory is shown in (1.2). The chart requires some explanation. In underlying phonological representations, i.e. those given between forward slashes, palatalized consonants will be indicated with a superscript: /C^{pal}/. Because non-coronals and rhotics never actually surface with palatalization, which instead makes itself felt on adjacent vowel nuclei, no surface-orthographic renderings are necessary aside from the ones used for the plain versions of the consonants. On the other hand, phonologically palatalized coronals (aside from rhotics) do surface as palatal, with inherent palatal place of articulation. The orthographic renderings of these are shown in between the underlying C^{pal} representations and the bracketed IPA counterparts.

(1.2) Palatalized consonant inventory

	Labial	Coronal	Velar	Labiovelar	Glottal
Stops	p^{pal} mb^{pal}	t^{pal}-ty-[c] nd^{pal}-ndy-[ɲɟ]	k^{pal} ng^{pal}	kw^{pal} ngw^{pal}	
Affricates		ts^{pal}-ch-[tʃ] nts^{pal}-nch-[ntʃ]			
Fricatives	--	s^{pal}-x-[ʃ]			j^{pal}
Nasals	m^{pal}	n^{pal}-ñ-[ɲ]			
Laterals		l^{pal}-ly-[ʎ]			
Rhotics		r^{pal} rr^{pal}			
Glides	w^{pal}	--			

The underlying vowel inventory is shown in (1.3a). It consists of the five cardinal vowels and their aspirated (vowel plus glottal fricative) counterparts. In (1.3b) are the surface diphthongs than can arise in word-final syllables as the vowel diphthongizes to cue the phonologically plain or palatalized status of the word-final consonant. The rising diphthongs come from underlying front vowels which add a back-vowel component before plain consonants. Meanwhile, the falling diphthongs come from underlying back vowels which add a front-offglide component before phonologically palatalized non-coronal consonants.

(1.3) Vowel inventory

a. Underlying phonemes: plain and aspirated

	Front	Back
High	i ij[ih]	u uj[uh]
Mid	e ej[eh]	o oj[oh]
Low		a[ɑ] aj[ɑh]

b. Derived diphthongs

VC#	Rising	VC# (non-coronal C)	Falling
/i/ before plain $C_{[+s.g.]}$	iu [ju]	/u/ before C^{pal}	ui [uj]
/i/ before other plain C	io [jo, jʌ, jə, jɨ]	/o/ before C^{pal}	oi [oj]
/e/ before plain C	ia [ja]	/a/ before C^{pal}	ai [aj]

Following is a list of orthographic conventions that I will use:

Plain vs. palatalized final consonants. CVC roots, including bound verbal roots, will be cited with the vowel quality they would take if unsuffixed, i.e. word-final. That is, citation forms of roots will reflect diphthongization. For example, monophthongal front vowels can be taken to reflect phonologically palatalized root-final consonants, e.g. *pek* 'shoulder' /pek^{pal}/ and *mik* 'monkey' /mik^{pal}/, since diphthongization would have happened in the environment of a plain consonant, e.g. *-ndiak* 'speak' /-ndek/ and -*miok* 'descend' /-mik/. This is to avoid the use of excessively abstract diacritics in the orthography, and to cite what are probably the most frequent actual pronunciations of the roots.

On the other hand, the citation forms of "suffixing" roots, which never appear without a suffix, do not reflect diphthongization, which never actually applies in these roots. Citation forms of suffixing roots are recognizable because they are written with a dash following the root: *CVC-*. This is the one case in which an orthographical representation for palatalized non-coronals is needed, since they need to be distinguished from plain ones in an orthographically expedient way for the purposes of the citation form. In this case, palatalized non-coronals are written with a *Cy* digraph: *chupy-* 'fill', itr. /ts^{pal}up^{pal}/ and *jiry-* 'scatter', itr. In suffixing roots, therefore, the plain vs. palatalized status of the word-final consonant is indicated on the consonant itself.

Allophonic onset palatalization. Palatal coronals {*ty ndy ñ ly x ch nch*} occur allophonically before front and high vowels *i, e,* and *u.* Meanwhile, plain allophones *t nd n l s ts nts* are found elsewhere, i.e. before non-high back vowels *a* and *o*. Palatalization is found before broken vowel nuclei *io*, *iu* and *ia* just as before other front vowels. For the digraphs {*ty ndy ly*}, the redundant *y* will be omitted before high front vocalic elements, i.e. before the nuclei {*i io iu ia*}. This convention will apply across morpheme boundaries, so that a root like *-kaly* 'wait' + epenthetic *iu* + first-person *s* will be written as *-kal-ius*.

Hiatus. Tautomorphemic sequences of consecutive vowels will always be one of the diphthongs listed in (1.3b). In particular, word-initial *io-* is a glide-vowel sequence. Sequences of consecutive vowels across morpheme boundaries are always in hiatus, including consecutive identical vowels. Rare cases of long vowels will be written with a colon, e.g. *a:*.

Final stop phase deletion. Citation forms will not reflect the systematic deletion of the stop phase of word-final prenasalized stops, but the spelling of specific examples will. Thus the root *-tsamb* 'bite' will be cited with underlying prenasalized stop, but word-final usages will be spelled e.g. *a-tsam* 's/he bites'. Similar alternations obtain between *nd/n* and *ndy/ñ*, while the same alternation applies to *ng* but no orthographic distinction will be made due to the predictability of the absence of the final stop phase.

Vowel reduction. In unstressed, i.e. nonfinal, syllables, the high/mid-vowel distinction is phonetically eroded, if not entirely collapsed (§2.3.3). The orthography normalizes reduction and gives the underlying vowel, wherever it can be diagnosed. Actual token pronunciations are occasionally given alongside the normalized versions.

Optional deletions. Parentheses in citation forms indicate segments that are optionally or variably deleted. Parentheses in specific examples reflect a segment that has been optionally omitted in that particular token, but is included to avoid confusion about inconsistencies between different tokens of the same root or word.

Morpheme boundaries. Word-internal morpheme boundaries are indicated with a dash, while boundaries between words and clitic-like prefixal particles is indicated with an equal sign. A period is used to demarcate infixes, reduplicants, some instances of recognizable but lexically fossilized morphological structure, and other morphological elements that are not necessarily glossed separately or linearly.

Epenthetic vowels are generally grouped as part of the suffixes that introduced them, while epenthetic glides at morpheme boundaries (§2.4.2) are grouped with the first rather than the second morpheme.

Chapter 2

Phonology

This chapter gives an overview of the phonology of the San Francisco del Mar dialect of Huave. I start by presenting the consonant and vowel inventories; this immediately sets up a suite of central issues regarding the distribution and realization of consonant palatalization. Palatalization is phonologically contrastive on almost all consonants morpheme-finally, but is realized in different ways (e.g. change in primary place of articulation of consonant, change in neighboring vowel nucleus) for different consonants and in different phonotactic environments. Elsewhere, i.e. in onsets, palatalization is found only allophonically (before front and high vowels) on a subset of coronals, and does not occur at all on other consonants.

Another set of issues revolves around the behavior of laryngeal features associated with the glottal fricative *j*. I analyze Huave as having two kinds of *j*: a genuine consonant that appears in onsets, and a postvocalic glottal fricative which is part of the vowel nucleus and referred to here as "vowel aspiration." Several distinct types of alternations between the presence and absence of *j* are conditioned by factors such as dissimilatory pressure from nearby [+spread glottis] features, cooccurrence restrictions between vowel aspiration and certain types of adjacent consonants, and/or metrical position within the word.

A number of other processes are discussed, including the creation of derived segments through fusion; phonotactically or prosodically conditioned deletions and reductions; and glide/vowel and glide/zero alternations. The chapter concludes with a brief examination of phonological patterns in the adaptation of Spanish loanwords.

2.1 Inventory

2.1.1 Consonants

The primary feature of the Huave consonant system is its division into plain and palatalized series: all consonants except for the palatal glide *y* (and possibly the glottal fricative *j*) come in plain/palatalized pairs. The plain Huave consonant inventory is given in the table in (2.1), which shows the orthographic representations used in this thesis, along with corresponding IPA symbols in brackets.

(2.1) Plain consonant inventory

	Labial	Dental	Velar	Labiovelar	Glottal
Stops	p mb	t nd	k ng[ŋ(g)]	kw ngw[ŋgw]	
Affricates		ts nts			
Fricatives		s			j[h]
Nasals	m	n			
Laterals		l			
Rhotics		r[ɾ] rr[r]			
Glides	w	y[j]			

The palatalized consonant inventory in (2.2) shows the C^{pal} symbols that I will use to indicate palatalized consonants in underlying phonological representations. As for surface phonetic realizations, the palatalized coronals have palatal place of articulation, for which orthographic and IPA symbols are given. On rhotics and non-coronals, however, palatalization is an abstract feature: the consonants themselves never surface with palatalization, which is instead realized on adjacent vowel nuclei in various ways that will be covered below. Thus only the C^{pal} underlying phonemes are given. Palatalized rhotics and non-coronal consonants surface identically to their non-palatalized counterparts, with the variable exception of ng^{pal}, which optionally surfaces as *ñ* word-finally.

Notable characteristics of the consonant system include a voicing contrast between voiceless and prenasalized obstruents; a contrast between tapped and trilled rhotics; and a gap in the nasal series, namely the absence of velar nasals. As for the gaps in the palatalized consonant inventory, it is understandable that *y* does not come in a plain/palatal pair since it is inherently palatal. Phonologically however, it appears to behave as plain (§2.4.2). The other gap, the nonexistence of j^{pal}, is not completely certain, but any rate no unambiguous examples have been found so far (see §2.1.4).

Although affricates, prenasalized obstruents, the rhotic trill, and palatalized coronals are written as digraphs, they are single segments. There are no consonant clusters in any position (initial, medial, or final) in native Huave words or older loans, though clusters have entered the language via recent Spanish loans. (One possible exception will be discussed presently.) Nonfinal syllables are thus (C)V, while final syllables are (C)V(C); most roots and words are consonant-final.

(2.2) Palatalized consonant inventory

	Labial	(Alveo-)Palatal	Velar	Labiovelar	Glottal
Stops	p^{pal} mb^{pal}	t^{pal}-ty-[c] nd^{pal}-ndy-[ɲɟ]	k^{pal} ng^{pal}	kw^{pal} ngw^{pal}	
Affricates		ts^{pal}-ch-[tʃ] nts^{pal}-nch-[ɲtʃ]			
Fricatives		s^{pal}-x-[ʃ]			--
Nasals	m^{pal}	n^{pal}-ñ-[ɲ]			
Laterals		l^{pal}-ly-[ʎ]			
Rhotics		r^{pal} rr^{pal}			
Glides	w^{pal}	--			

Some phonetic observations can be made:

- The realization of *w* ranges from labiovelar glide [w] to voiced bilabial fricative [β], depending on degree of labial occlusion. The fricative productions are frequent in onset position, but codas are almost always glide-like.

- In initial position, prenasalized stops *mb*, *nd*, *ndy* and *ng* sometimes have a clear nasal phase, but at other times it is lost completely and the segment surfaces as a voiced stop *b, d, dy,* or *g*. This varies by lexical item: some words are always or almost always pronounced with one or the other, while others show more even variation. (Compare §2.3.1 on the obligatory, phonological deletion of the stop phase of prenasalized stops in word-final position.) Intervocalically, prenasalized stops are usually realized with clear nasal and stop phases, but there are a few examples of variable voiced-stop-only or even spirantized voiced-fricative realizations. These latter pronunciations may not be available for all words; conditioning factors and permissible contexts remain to be investigated.

- The prenasalized affricate *nch* is realized with varying degrees of voicing on the affricate portion, such that it varies along a continuum from [ntʃ] to [ndʒ].

- Labiovelar stops, already relatively infrequent, are in apparent free variation with plain velars in many of the words where they appear: *-k(w)ior* 'run' (3;16/4;2), *ung(w)iujts* 'night' (2;16), *ng(w)iat* 'chalk, ash' (3;19/2;32). All of these words have diphthongized vowels, so it is possible that this is a conditioned process to avoid phonetic triphthongs, but more data on the realization of labiovelars should be collected.

In addition to the basic consonants in (2.1) and (2.2), there are some marginal phonemes, shown in (2.3). These are either rare, occurring in only a couple of lexical items, or their phonemic status is questionable. A discussion of them is useful in illuminating some gray areas at the boundaries of the concept of contrastiveness.

(2.3) Marginal phonemes

	Labials	Coronals	Velars
Stops	b	d	g
Fricatives	f[φ] v[β]	ð	
Rhotics		ndr	

The sequence *ndr* is, to my knowledge, found only in the root *ndro*- 'to be lost, ruined' and its causative-suffixed variant *-ndro-jch* 'to lose, ruin'. The rarity of *ndr* has been pointed out by Suárez (1975:3), and also by Noyer (2003:10) for the San Mateo dialect. One possibility is to interpret *ndr* as an underlying prenasalized flap /nr/ that surfaces with an emergent consonant, which naturally arises in the transition from nasal to rhotic when the velum is lowered (closing off the nasal passage) but before the coronal occlusion is released (Ohala 1997). This would preserve the generalization that Huave prohibits consonant clusters. However, the other possibility is that it is a bona fide cluster of prenasalized stop plus rhotic, in which case it should not be counted as an independent phoneme. The latter hypothesis is probably correct at least for San Mateo, whose initial *ngr*- attested in the word *ngrex* 'red snapper' (Stairs and Stairs 1981:409) cannot be explained by consonant emergence.

Although there is a significant number of Spanish loanwords, the extent to which they have introduced new phonemes is unclear. In native vocabulary, *f* is not an independent phoneme, but rather the fused realization of vowel aspiration followed by *w* (§2.1.4). However, Spanish words with [f] or [hw] have been borrowed with *f*, introducing it in positions - namely word-initially - where it is potentially contrastive and in any case not reducible to aspiration plus *w*; see (2.101).

Besides /f/, other Spanish phonemes not found in native Huave are the voiced stops /b d g/. These have generally been borrowed into Huave as *b d g*, but because they are phonetic variants of prenasalized stops anyway (as also observed by Suárez 1975:15), they do not appear to contrast with *mb nd ng*, even if the frequency of prenasalization is vastly lower with Spanish loans than in native Huave words. Intervocalic voiced stops are systematically spirantized to [β ð ɣ], as in Spanish, but since native prenasalized stops are also subject to occasional intervocalic spirantization, voiced and prenasalized stops cannot be reliably distinguished on this criterion either.

To give some concrete examples of phonemicization problems in native Huave words, the voiced interdental fricative *ð* is found in *naðam* 'big' and its reduplicated form *naðaðam*, but it probably cannot be considered an instance of *nd* since it never alternates with it in this particular lexical item. Meanwhile, a non-alternating voiced alveolar stop *d* occurs in irregular second-person forms of the verb root *-w* 'to go out', for instance *idiow* 'you go out', *imediow* 'you will go out', and *tediow* 'you went out' (see §6.3.8); it does not alternate with *r* (which was possibly its historical source) and certainly not with *nd*. On the other hand, *biom* 'fire, hearth' lacks prenasalization on its initial consonant, but the bound, clearly related Class 1 variant is *-mbiom* 'home', which obligatorily takes a possessive prefix and always has prenasalization on the stop.

As for the voiced bilabial fricative [β], it is found initially in some Spanish loans such as *ventan* 'window' (from Sp. *ventana*); since [β] is also an acceptable realization of *w*, though, it is perhaps not contrastive. Nevertheless, such loans do not show the variation between [w] and [β] pronunciations that native *w*-initial words do. (The apparently variable stop vs. fricative borrowing of Spanish words beginning in *b*- or *v*-, which are of course the same sound, seems to reflect variation in the Spanish pronunciations.)

Finally, although the velar nasal [ŋ] occurs word-finally, it is probably always reducible to the *ng* phoneme, since the stop phase of prenasalized stops is deleted word-finally. In many words this is straightforward because when suffixes are added, the final velar nasal alternates with a prenasalized velar stop (§2.3.1). However, this is more problematic in words that never take suffixes, and the postulation of an underlying stop phase that never surfaces requires a certain degree of abstractness. This abstractness is perhaps quite well-justified by the simple distributional fact that [ŋ] never occurs initially or medially, but it is worth pointing out explicitly.

2.1.2 Vowels

Huave has five vowel phonemes, shown in (2.4).

(2.4) Vowel inventory

	Front	Back
High	i	u
Mid	e	o
Low		a[ɑ]

Given the plain/palatal opposition in consonants, it is important to demonstrate the independent status and contrastiveness of the five vowel qualities. To this end, a sample of vowel-initial words is reproduced from the fuller list in §5.3.1. These show that vowel quality is not dependent on the preceding consonant. Data showing that vowel quality is independent of the following consonant is given below in the section on the distribution of palatalization.

(2.5) Vowels in initial position

a. ix ‘iguana’, ijk ‘toasted corn’, ijty ‘human feces’, iñ ‘*gulabere* (plant)’
b. eñ ‘*mangle blanco* (tree)’, ex ‘*tacazonte* (fish)’
c. as ‘elote’, ap ‘father/mother-in-law of woman’
d. orr ‘shell’, oik ‘cloud’, onts ‘garza (bird)’
e. us ‘maize’, up ‘leaf’, um ‘egg’, unts ‘secretion’

Some minimal pairs of verb roots, differing only in their vowel, are given in (2.6) to further establish the contrastiveness of the vowels. The first two pairs contrast in frontness/backness for vowels of the same height, while the latter two show the mid/high contrast in vowels of the same frontness/backness.

(2.6) Minimal pairs for vowel backness/height

a.	-mily ‘pick up (one by one)’	b.	-j.muly ‘enter’
c.	-pety ‘braid, weave thick strands’	d.	-j.poty ‘burst’
e.	-mbul ‘help’	f.	-mbol ‘fear’
g.	-xing ‘be ashamed’	h.	-xeng ‘lift, raise’

There is also contrastive vowel aspiration for all five vowels. Aspirated vowels are realized as sequences of vowel + glottal fricative: *ij, ej, aj, oj,* and *uj*. Some minimal pairs for plain and aspirated vowels are shown in (2.7).

(2.7) Minimal pairs for vowel aspiration

a.	-xip ‘swell, get fat’	b.	-xijp ‘bathe’
c.	-pek ‘carry on shoulders’	d.	-pejk ‘stoke (fire)’
e.	sap ‘sheep; cotton; pimple’	f.	sajp ‘seed’
g.	-toch ‘trip, stumble’	h.	-tojch ‘whip’
i.	-muty ‘spy on’	j.	mujty ‘huipil’ (woman’s blouse)

Vowel aspiration and the glottal fricative consonant sound very similar, if not identical. I leave it an open question whether a phonetic investigation could reveal differences betwen them. Suárez (1975:16) reported his impression that aspiration on stressed vowels (in words like (2.7f)) was weaker than on pretonic, preconsonantal *j* (with roots like (2.6d)), the latter of which is more similar in strength of voiceless frication to consonantal *j* as in words like *joy* ‘hammock.’ Incidentally, this phonetic observation is directly relatable to an alternation in the San Mateo del Mar dialect between long vowels in stressed, i.e. final, syllables, and aspirated vowels in unstressed, i.e. prefinal, syllables. Long vowels in San Mateo final syllables simply correspond to the phonologically nonalternating aspirated vowels in San Francisco.

(2.8) Vj/V: alternation in San Mateo del Mar (Stairs and Hollenbach 1981:285)

	San Mateo del Mar		San Francisco del Mar
a.	a-ndaab ‘it burns’, itr.	b.	a-ndajp ‘it burns’, itr.
c.	a-ndajp-üw ‘they burn’, itr.	d.	a-ndajp-aw ‘they burn’, itr.

The five monophthongs and their aspirated counterparts make up the full underlying inventory of Huave vowel nuclei. On the surface however, there are diphthongs, both rising and falling. A list of these is given in (2.9). They are found in closed (i.e. stressed, i.e. final) syllables, or variably in nonfinal root and suffix syllables; see (2.53) for examples of the latter phenomenon and §3.6 and §4.6.2 for discussion.

(2.9) Surface diphthongs

Rising	Falling
iu [ju]	ui [uj]
io [jo, jʌ, jə, jɨ]	oi [oj]
ia [ja]	ai [aj]

Diphthongization is part of the realization strategy for the plain/palatal contrast on final consonants. Rising diphthongs come from the backing of front vowels /i/ and /e/ before plain coda consonants in a process of “vowel breaking” (terminology following Noyer 2003). In closed syllables, /i/ and /e/ can only surface as monophthongal *i* and *e* if the coda consonant has phonological palatalization. Breaking thus cues the phonologically plain status of the final consonant, while preservation of monophthongal frontness is a cue to final-consonant palatalization.

The vowel breaking rules are schematized and illustrated in (2.10). Before phonologically plain codas, underlying /i/ breaks to a palatal glide [j] plus a back/central nonlow vowel that can range phonetically from [o] to [ʌ] to [ɨ]. Before voiceless fricatives *j* (i.e. vowel aspiration), *s*, and *f*, the resulting diphthong is the distinctly higher and more rounded [ju]. Meanwhile, underlying /e/ breaks to [ja]. The precise relationship in phonetic space between these diphthongs and the monophthongal back vowels remains to be investigated.

(2.10) Vowel Breaking

/i/ → iu [ju] before [+s.g.] coda or vowel aspiration in closed syllables

a. /t^{pal}ijt/ → tiujt 'road'
b. /kis/ → kius 'dog'
c. /a-t^{pal}-Vf/ → |a-t^{pal}-if| → a-t-iuf 'they eat'
d. cf. /win^{pal}/ → wiñ 'tortoise'

/i/ → io [jo] before all other plain codas

e. /s^{pal}il/ → xiol 'tree, wood'
f. /mik/ → miok 'bat'
g. /a-jir/ → a-jior 's/he has' (1;131)
h. cf. /mil^{pal}/ → 'lisa fish'

/e/ → ia [ja] before plain codas

i. /pets/ → piats 'tortilla'
j. /a-nd^{pal}ek/ → a-ndiak 's/he speaks'
k. /u-mejts/ → u-miajts 'his/her/its heart, insides'
l. cf. /pek^{pal}/ → pek 'shoulder'

The falling diphthongs *ui*, *oi*, and *ai* arise when back vowels *u*, *o*, and *a* occur immediately before a phonologically palatalized *noncoronal* coda - that is, a consonant with an abstract palatalization which cannot be manifested on the consonant itself - and shows up as a palatal glide in the preceding vowel nucleus instead. It is important to note that this process does not happen when the final consonant is a palatal coronal, nor (for different reasons) with rhotics; on the latter, see (phonotactics subsection). In the case of aspirated vowels, the palatal offglide surfaces in the voiced part of the vowel before aspiration, as in (2.11c).

(2.11) Consonant Fission

V(j)C^{pal} → Vi(j)C, where V is a back vowel and C is noncoronal

a. /puk^{pal}/ → puik 'feather'
b. /a-$long^{pal}$/ → a-loing 's/he hangs it'
c. /a-$najp^{pal}$/ → a-naijp 's/he sells it' (3;70)
d. cf. /kat^{pal}/ → katy 'fish'

More detail on the diphthongization processes, and justification for the underlying phonemicizations, will be given below in §2.2. In-depth discussion of diphthongization and palatalization will be the topic of Chapter 3.

2.1.3 Two kinds of *j*

According to the analyses of the vowel and consonant inventories as just presented, there are two kinds of glottal fricative *j* in Huave. The first is a consonant, with plain and palatalized variants like any other consonant (2.12a-c). The second is vowel aspiration (2.12d-f), which displays some distinctive behaviors and might be considered as belonging to the vowel nucleus; it does not contrast for palatality.

(2.12) Two kinds of *j*?

	Initial (fully consonantal)		Postvocalic (vowel nucleus)
a.	jam 'lizard'	d.	tajk 'skin'
b.	jely 'clothes'	e.	-pejp 'lay (sthg.) down'
c.	-jior 'have'	f.	pujkur 'armadillo'

Word-final *j*, in words and roots like *poj* 'tortoise' and *-paj* 'call', is ambiguous between vowel aspiration and coda consonant. However, there is no evidence that vowel-aspiration *j* and consonantal *j* contrast in this position, and some (largely negative) evidence suggests that all instances of word-final *j* can be considered as vowel aspiration. Plain coda *j* seems not to exist insofar as my data include no instances of front-vowel breaking before a word-final *j*. Since front vowels generally break before plain coda consonants, this implies that none of the *j*-final words with front vowels can be considered to end in plain consonantal *j*. In the mirror image, palatal coda j^{pal} seems not to exist insofar as my data include no true instances of falling diphthongs *ai, oi,* or *ui* before word-final *j*, which are otherwise expected whenever a back vowel precedes a palatalized coda consonant. All apparent attestations of *Vij#* configurations result from the deletion of final consonants after aspirated vowels, as described in §2.3.1; in all of these the root-final consonants are restored upon suffixation. Furthermore, the only potential example I have found so far of a CVj^{pal}- suffixing verb root can be shown in fact to end in an aspirated vowel plus palatal glide, -*Vjy*; see (2.15).

Other reasons to treat word-final, postvocalic *j* in CVj(C) as part of the vowel nucleus rather than as independent consonant are found in its alternations with vowel length. We have just seen evidence in (2.8) for aspiration being part of the vowel in San Mateo del Mar, where there is a phonologically conditioned alternation between aspiration and vowel length. Although the San Francisco del Mar dialect does not have this same alternation, it has something similar, albeit more limited. In the case of word-final *j*, there is inter- and intraspeaker variation between aspirated vowels and fully voiced vowels of conspicuously long duration. This is particularly salient in nouns like *kuj~ku:* 'metate' (2;18) and *naj~na:* 'black wax' (1;177/1;136), for which both variants are found even in careful speech. On the other hand, *j*-final verb roots such as *kaj* 'look for' are cited in careful speech with a voiceless fricative, with aspiration weakening (and possibly compensatory lengthening, the degree of which has not been investigated) found mainly in connected speech.

Another type of *j~Ø* alternation is the variable deletion of aspiration in antepenultimate syllables, as discussed below in §2.5.4. If the deletion turns out upon further phonetic analysis to go hand in hand with compensatory lengthening, this would be another example of the close association of postvocalic *j* with the vowel nucleus.

An arguably positive consequence of the nuclear-*j* analysis is that the analysis of *Vj* as vowel aspiration preserves the generalization that Huave does not have consonant clusters. If *j* were treated as a coda consonant, *jC* would be just about the only cluster type permitted in the language, both word-finally and word-medially. This exceptional presence and distribution of such a cluster could have come about through a variety of diachronic scenarios, but such justification seems unnecessary, given that no independent motivation for the consonantal analysis of postvocalic *j* is forthcoming. There is also no independent motivation for saying that CVjC reflects a preaspirated final consonant; on the contrary, the absence of aspirated consonants from onset position provides a distributional argument against this hypothesis.

Several morphemes have *j*-ful and *j*-less allomorphs, described in Chapter 5, which under this analysis are described as the presence or absence of a [+spread glottis] autosegment, rather than of an additional consonant. These include nominals with *na(j)-* and *ka(j)-* prefixes, the passive infix *-rV(j)-,* and causative suffix *-(j)ch*. Allomorph selection appears to be idiosyncratic in all of these affixes; no phonological, morphosemantic, or lexical conditioning for aspirated allomorphs has been found. Although Suárez (1975) accounted for aspirated prefixes by positing *j*-initial roots, this analysis does not work for non-prefix affixes like the passive and the causative, and misses the generalization that there is a *j~Ø* alternation found in a variety of affixes.

It should be pointed out that nothing here hinges crucially on the claim that postvocalic *j* forms an exclusive prosodic constituent with its preceding vowel. The important descriptive generalizations lie in the aspects of glottal-fricative distribution and behavior that differ from those of consonants in general.

2.1.4 Fused segments

A sequence of *Vj* + *w* never surfaces as such; instead, the aspiration and *w* fuse so that the sequence is realized as *Vf*, with a voiceless bilabial fricative (written for convenience with *f*). This relationship can be seen in morphophonological alternations where the concatenation of *j* and *w* from different morphemes results in a fused segment *f*. For example, the passivization process described in §6.4.3.3 involves adding aspiration to the theme vowel (in addition to depalatalizing the root-final consonant, not relevant here), as illustrated in (2.13ab). When a *w*-initial root is passivized, however, we see the effects of fusion (2.13cd). Similarly, we can assume that the *w~f* alternation in (2.13ef) is caused by the addition of the aspirated variant of the prefix *ka(j)-*, since the trigger for the change of *w* to *f* must have come from somewhere, and *ka(j)-* is independently known to have an aspirated allomorph (§5.3.1). Lastly, in (2.13gh), fusion occurs upon the concatenation of intransitive [+round] to a root ending in an aspirated vowel, when there is no further suffix that would enable [+round] to surface as a vowel heading its own syllable as it does in (2.13g).

Because of fusion, segment-based morpheme breaks are somewhat inadequate, but are given anyway to facilitate parsing of the examples.

(2.13) Origin of the fused segment *f* in concatenations of *j* + *w*

a.	a-kaly 's/he waits, stays'	b.	a-j.kal /a-j.kal/ 's/he is waited for'
c.	a-wañ 's/he removes it'	d.	a-fan /a-j.wan/ 's/he, it is removed'
e.	wax 'on'	f.	ka-fax /kaj-was[pal]/ 'above' (3;23)
g.	piaj-u-s lie-ITR-1 'I lie down' (1;165)	h.	pia-f /pej-w/ lie-ITR 's/he lies down'

The insight that *f* is a derived segment rather than an independent phoneme is supported by, and in turn explains, the fact that *w* and *f* never contrast word-initially in native vocabulary. If *f* is a fusion of vowel aspiration and *w*, it requires a preceding vowel that hosts the aspiration, and logically cannot come about as a word-initial consonant. The minimal pairs in (2.14) thus contrast not in the identity of the relevant consonant, but in the plain versus aspirated status of the preceding vowel. Note in relation to (2.14d) that the related word *kajlay* 'north' has an aspirated first vowel, which supports the idea that the first vowel of the 'south' word could also be underlyingly aspirated.

(2.14) Medial and final *w/f* contrast

a.	kaw /kaw/ (plural demonstrative)	b.	kaf /kajw/ 'moon'
c.	kawak /kawak/ 'chicozapote'	d.	kafak /kaj-wak/ 'south' (cf. kaj-lay 'north')

Further evidence for *f* as a fusion of aspiration and labiality is shown below in §2.4.3 and §2.5.1: when laryngeal or labial dissimilation deletes either its *j* component or its *w* one, the component not deleted is the segment that surfaces in lieu of *f*.

Similarly to the fusion of aspiration with the labial glide, aspiration plus a palatal glide also creates segmentation ambiguities, although the extent to which *jy* sequences fuse into a voiceless palatal fricative [ç] is unclear, pending closer phonetic investigation.

It is useful to demonstrate that aspirated vowels do occur before root-final *y*, since the one attested instance, the suffixing root *mbajy-* 'to collapse', requires some analysis to show that it is in fact *CVjy* and not *CVj*^{pal} (the former with an aspirated vowel and coda *y*, the latter with a non-aspirated vowel and coda *j*^{pal}). Two forms of *mbajy-* are shown in (2.15). The key lies in the quality of the suffix vowel: according to the rules of vowel harmony as covered in detail in Chapter 4, a root ending in a palatalized consonant would take the suffix vowel *i* (which would then break to *io* in the context before a plain coda consonant). On the other hand, if this root ended in a plain consonant, it would be expected to take the suffix vowel *a* (given that the root vowel is *a*). The latter scenario is the attested one, so I conclude that this is an example of an aspirated vowel plus coda *y*.

(2.15) Vowel aspiration before palatal glide *y*

a. Ngo mbajy-a-m
not collapse-V-SB
'it doesn't collapse' (4;21)

b. La=mbajy-a-w
PF=collapse-V-ITR
'It has collapsed, fallen down (earth, a wall)' (4;53)

The other, more common scenario in which *j* + palatal glide sequences are created is where consonantal, root-initial *j* occurs before a broken front vowel in roots like *-jionts* 'cry' and *-jior* 'have'. A question that arises here is whether root-initial *j* (presumably a consonant) before a palatal glide like in *-jionts* is phonetically different from postvocalic *j* preceding a palatal glide, as in (2.15). This bears not only on the discussion of two kinds of *j*, but also on the phonology of the glides, since the palatal glide after root-initial *j* would be from a broken vowel, while the one after postvocalic *j* is phonologically a coda consonant.

Lastly, the extent of sonorant devoicing in sequences of *j* + nasal/liquid {*m, n, ñ, l, mb, nd, ndy, ng*} would be another related topic for phonetic investigation. For example, it is possible that in fast speech there is significant overlap between the period of voicelessness and the period of consonant occlusion.

2.1.5 Prosodic observations

Much of Huave prosody is as yet uninvestigated. Due to the lack of contrasts in stress and tone at the word-prosodic level (along with the lack of length contrast, arguably, since long vowels are marginal and always alternate with aspirated ones), the emphasis in preliminary research has been on alternations in the segmental phonology. To be more specific, the San Francisco del Mar dialect has no lexical tonal contrast of the (marginal) kind found in the dialect of San Mateo del Mar (Pike & Warkentin 1961, Noyer 1991, Evanini 2007), and there is fixed final stress. There is not as of this writing a sufficient case for secondary stress, syllable weight distinctions, or other complexities in the metrical phonology, though see §2.5.4 for hints in that direction. Of course, the analysis of postvocalic *j* as part of the nucleus predicts a syllable weight distinction that could make itself felt somewhere in the phonology.

It is certain that further phonetic and phonological research on Huave word prosody would be fruitful, and the present absence of information should be taken to reflect a lack of time on the part of the author rather than an insufficient sense of urgency regarding the importance of the topic. Intonation in particular is a crucial but oft-neglected part of the description of any language, all the more in languages where word prosody carries a low to nonexistent functional load.

Primary stress falls on the final syllable of each word regardless of morphological constituency. Stress will therefore fall on the root if there are no suffixes, and on the final suffix if there are suffixes. Phonetically, stress is cued by pitch, with isolation forms typically having a low plateau in the non-final syllables and a high peak in the final syllable (cf. Evanini 2007). It is likely that there are durational differences between stressed and unstressed syllables, although no solid claims can be made until instrumental work is undertaken. Aside from its phonetic correlates, stress also manifests itself by conditioning segmental alternations such as full vs. reduced vowel quality (§2.3.3). Diphthongization is also restricted largely to stressed syllables, although stress is only one of several conditioning factors (see Chapter 3).

Research on Huave intonation has focused on the interaction of lexical tone with sentence-level intonation in the dialect of San Mateo del Mar (Pike & Warkentin 1961, Noyer 1991, Pak 2007). A salient intonational feature of the San Mateo dialect is high-toned plateaus that extend rightward from stressed syllables of a certain tonal specification across the next several words, depending on syntactic boundaries explored by Pak (2007). Such rightward-extending plateaus exist in the San Francisco dialect as well, although impressionistically they tend to be shorter and less frequent; it is common for pitch to drop on the unstressed syllables of the next word, rise on the next stressed syllable, drop for the next word, etc. A fuller study of San Francisco del Mar intonation will be of interest not only in itself, but also because it will create an opportunity to compare two intonational systems that are related, even as the word-prosodic systems they are overlaid on differ in whether or not they have lexical tone.

2.2 Phonotactics

2.2.1 Palatalization in onsets

Because a number of phonological processes interact with or depend on palatalization (e.g. diphthongization, vowel harmony), it is useful relatively early in the exposition of Huave phonology to establish the distribution of the palatalized consonant series in (2.2): whether all of them occur in all positions, whether palatalization is ever predictable from the vocalic environment, and in which set of contexts palatalization is contrastive. In this section, I will interweave discussion of the distribution of palatalization with description of how the palatalization contrast is realized on different consonants in the various positions where it occurs. The realization of palatalization has been partly foreshadowed already, in the discussion of diphthongization in §2.1.2.

Palatalization as an abstract secondary feature is contrastive on nearly all consonants, but a crucial distinction exists between what I will call "palatalizable" and "non-palatalizable" consonants (Suárez 1975:17). "Palatalizable" consonants are the coronals *t nd n l s ts nts*, and their unifying characteristic is that their palatalized versions differ from the plain ones in primary place of articulation - palatal and dental, respectively. "Non-palatalizable" consonants comprise all non-coronals (*p mb k ng kw ngw m w j*) plus the rhotics *r* and *rr*. On these, abstract palatalization is realized not by a difference in primary place of articulation of the consonant, nor even by secondary palatalization, but by effects on a neighboring vowel nucleus. The consonant itself surfaces with the phonetic value of its plain counterpart.

The distribution of plain versus palatalized consonants in onset position is different for palatalizable as opposed to non-palatalizable consonants. For the former, palatalization is allophonic, and depends on the quality of the following vowel. Palatal allophones {*ty ndy ñ ly x ch nch*} occur before front and high vowels *i, e,* and *u.* Meanwhile, plain allophones *t nd n l s ts nts* are found elsewhere, i.e. before non-high back vowels *a* and *o*. Palatalization is found before broken vowel nuclei *io*, *iu* and *ia* just as before other front vowels.

(2.16) Allophony of palatalizable consonants in onsets

a. Plain {*t nd ts nts n l*} precede back, nonhigh vowels {*a o*}
b. Palatal {*ty ndy ch nch ñ ly*} precede front and/or high vowels {*i e u*}
c. Morpheme structure constraints for palatalizable C:
*/Ci/, */Ce/, */Cu/, */C^{pal}a/, */C^{pal}o/

The morpheme structure constraints enforcing complementary distribution of the plain and palatal consonants in onsets are illustrated with some lexical items in (2.17). In (2.17d) the palatalization is written in parentheses to emphasize the allophony; my orthography (as set out in chapter 1) normally omits redundant palatalization before *i*.

(2.17) Allophony of palatalizable consonants in onsets: Examples

a.	lam ‘river’	d.	l(y)ily ‘fish scale’
b.	tat ‘mangle blanco’	e.	tyety ‘father’
c.	sop ‘smoke, steam’	f.	xur ‘pot’

All of the palatals have primary palatal place of articulation, but there are differences between consonants and between vocalic environments in the strength of the palatal offglide on the transition into the following vowel (Suárez 1975:17). While {*ty ndy ñ ly*} have prominent palatal glide-like transitions into *e* and *u*, such transitions are relatively absent after the fricative/affricates {*x ch nch*}. For the former set, the offglides are most prominent in stressed (final) syllables, probably due to increased duration; the transitions are weak to nonexistent in unstressed syllables.

(2.18) CV transitions for non-fricatives and fricatives

a.	-lyej 'foot'	d.	xex 'bowl'
b.	ndyuñ 'shade, *ramada*'	e.	-nchum 'paint'
c.	tyum 'throat'	f.	-chunch 'grill'

In general, the palatal fricative and affricate have a lesser propensity to appear with palatal-glide transitions into the following vowel than do the other consonants. The phonetic durational consequences on vowel nuclei are unknown, for example if the nuclei in (2.18a-c) are longer than those in (2.18d-f) due to needing to accommodate a longer transition phase.

Before the broken vowel *ia* (from underlying /e/), the palatals{*ty ndy ñ ly*} surface before the broken-vowel nucleus *ia* without further modification to either the consonant or the vowel. However, there are no attested examples of fricative/affricate palatals preceding a rising diphthongal nucleus *ia* with a clearly intact palatal onglide. One interpretation is that fricative/affricate palatals absorb the palatal glide that makes up the first half of the diphthong such that there is no appreciable palatal glide phase between the consonant and the back vowel. Due to the type infrequency of words containing the phonological environment for *e*-diphthongization, it is uncertain whether there are words like the ones in (2.19d-f) that are not loans or onomatopoeic, i.e. whether there are cases of fricative/affricate palatals before *a* that cannot be argued to be underlying *a* rather than a diphthongization of *e*. Either way, the surface gap (although it needs to be confirmed acoustically) appears to hold.

(2.19) Realization of palatals before *ia*

a.	tiam 'earthquake'	d.	-nchak.nchak 'chew'
b.	liak 'chacharaca'	e.	xarr 'jar' (Sp. loan)
c.	-ndiak 'speak'	f.	chaly 'rebozo' (Sp. loan)

In contrast, broken variants of underlying /i/, namely *io* and *iu*, appear to retain the palatal-glide phase of the diphthong after all palatal consonants, fricative/affricate and stop/sonorant alike. Again, although the actual acoustics must be investigated instrumentally before solid claims are made, the impression is salient enough to deserve descriptive mention as a potential issue.

(2.20) Realization of palatals before *io*, *iu*

a.	-tiots 'think'	d.	-nchiop 'approach'
b.	-liok 'come'	e.	xiok 'I, me'
c.	-ndiom 'want; like'	f.	-chiot 'break'

Having discussed the distribution and realization of palatalizable consonants in onsets, I now turn to the non-palatalizable consonants, which consist of all non-coronals plus the rhotics. There is little to say here, as non-palatalizable consonants display no alternation at all in onset position; plain variants are found before all five vowels. There is no appreciable difference in consonant realization between front- and back-vowel environments that would motivate positing phonological C^{pal} for any onset non-palatalizable consonant. In particular, there are no palatal offglides before *e* or *u*, where we would expect secondary palatalization (if it existed) to be audible.

(2.21) Non-palatalizable consonants: Uniformly plain in onsets

a.	pijty 'epazote'	d.	pang 'chair'
b.	jely 'clothes'	e.	jam 'lagarto'
c.	kuk 'bird'	f.	kos 'knee'

The difference between palatalizable and non-palatalizable consonants is highlighted in some synchronic morphophonological alternations. In a couple of morphological contexts, alternations between a back, non-high vowel (*a* or *o*) and a front or high vowel (*i, e* or *u*) produce corresponding palatalization alternations on the preceding consonant.

One context is with verbal theme vowel alternations, illustrated in (2.22). The two possibilities for a prefixal theme vowel immediately preceding the root are the default *a*, and the valence-reducing *u* (see §6.1.4 on the morphosyntactic conditioning of theme vowel selection). The two coronal prefixes that can appear in this position are the first-person subordinate *n-* and the completive *t-*. Plain allomorphs of these occur before the theme vowel *a*, as illustrated in (2.22ac). However, they palatalize to *ñ-* and *ty-*, respectively, before the theme vowel *u-* (2.22bd). In comparison, the subordinate affix *m-*, which being a labial falls in the category of non-palatalizable consonants, shows no type of alternation before the two different theme vowels (2.22ef).

(2.22) Palatalization/lack thereof with theme vowel alternations

	a-theme		u-theme
a.	n-a-ty 1SB-TV-eat 'that I eat (it)'	b.	ñ-u-ty 1SB-TV-eat 'that I eat'
c.	t-a-ty CP-TV-eat 'S/he ate (it)' (1;95)	d.	ty-u-ty CP-TV-eat 'S/he ate' (1;95)
e.	m-a-ty SB-TV-eat 'that s/he eats (it)'	f.	m-u-ty SB-TV-eat 'that s/he eats'

Incidentally, both the first-person subordinate *n* and the completive *t* are mobile affixes, and when they appear word-finally they are plain (not palatal). Since they surface as plain in the absence of a following, alternation-conditioning vowel, the plain allomorph can be considered more basic. We can thus speak of a palatalization process before front and high vowels, rather than depalatalization before back non-high vowels.

The other morphological context where plain/palatal alternations can be observed on palatalizable consonants is in diminutivization. In this case, the alternating consonants belong to the root rather than to affixes. Diminutivization, as described in §6.5.2, involves raising all root vowels to high, plus palatalization of the root-final consonant. In the case of roots with *e*, raising to *i* makes no difference since both vowels are front and adjacent coronals will be palatalized anyway. In contrast, when back vowels *a* and *o* raise to become high vowels, palatalization is triggered on preceding coronals. Examples of these alternations are given in (2.23), with palatalized consonants boldfaced.

(2.23) Palatalization in diminutivization

	Augmentative		Diminutive
a.	n-a-ndan ‘blocked’ (2;151)	b.	n-a-**ñ**d**i**ñ (2;151)
c.	sonong ‘pile up’ (2;109)	d.	**x**u**ñ**ung (3;66)
e.	-lojty ‘pierce’ (3;61)	f.	-**ly**ujty (3;61)

Following the general pattern, vowel raising in diminutivization does not cause changes to the non-palatalizable consonants. This can primarily be seen in the lack of changes to the consonants preceding the newly-fronted vowels, even as other, eligible consonants in the word palatalize. Although the root-final consonants acquire phonological palatalization (as evidenced by their failure to trigger vowel breaking), they also do not have any phonetically palatal primary or secondary articulation.

(2.24) Diminutives: No palatalization of non-coronals

	Augmentative		Diminutive
a.	-wantsak ‘twist’ (3;65)	b.	-**w**inchi**k** (3;65)
c.	-sopop ‘drizzle’ (2;26)	d.	-xu**p**u**p** (2;26)
e.	-porros ‘crunching sound’ (2;150)	f.	-**p**u**r**ux (2;148)

Despite the general robustness of coronal palatalization before front and high vowels, however, there are cases where a morphologically concatenated suffix vowel fails to trigger palatalization as might otherwise be expected.

Epenthetic vowels are inserted upon concatentation of consonantal suffixes with consonant-final bases. When an epenthetic suffix vowels surface as *u* due either to vowel harmony (see Chapter 4), they never palatalize the preceding consonant. The example in (2.25a) shows that root consonants stay plain prior to epenthetic *u*, while the example in (2.25b) shows that *u* also does not palatalize a preceding consonant that belongs to another suffix.

(2.25) Epenthetic *u* does not trigger palatalization

a. T-a-mu**t**-*u*s mi-naty.
CP-TV-write-1 POS-name
'I wrote your name.' (2;93)

b. Tim t-a-nchum-*u***s**-*u*n u-mbas.
yesterday CP-TV-paint-1-PL POS1-front
'Yesterday we painted it(s surface)'. (2;99)

A related case of suffixal *u* failing to trigger palatalization is when *u* is the realization of the intransitive [+round] suffix. As described in §6.1.2, this autosegmental suffx is surfaces variably as a glide, high back rounded *u*, mid back rounded *o*, or not at all, depending on syllable structure and phonological and morphological context. It might be possible to say that the vowel slot itself is epenthetic, acquiring features through association to [+round], much as the epenthetic vowels in (2.25) are arguably empty slots that acquire features through vowel harmony. This line of thinking would locate the similar behavior of morphologically empty *u* and intransitive *u* (with regard to palatalization) in their common status as epenthetic vowels, though its viability awaits a fuller analysis of intransitive [+round].

(2.26) Suffix *u* from intransitive [+round]: no palatalization

a. pajk-a-**t**-**u**-s-un
face.up-V-CP-ITR-1-PL
'We (excl.) lie face up' (2;92)

b. wit-io-**n**-**u**-n
rise-V-1SB-ITR-PL
'that we (excl.) get up' (1;162)

It is not possible to test whether the front vowels *i* and *e* trigger palatalization when epenthesized vowel-harmonically, because vowel harmony only produces them after consonants that are already palatalized, never after plain consonants.

The only other vowel that occurs in suffixes is the reflexive suffix *-e*. The reflexive *-e* shows variation in whether or not it palatalizes a preceding coronal. Some examples of pre-reflexive palatalization are shown in (2.27). In (2.27a), an underlyingly plain root-final coronal surfaces as palatal. Note that plain and palatalized consonants contrast root-finally, as discussed in further detail in the next subsection, and so pre-reflexive palatalization has the potential to neutralize this contrast. In (2.27b), we see that the reflexive can also palatalize a preceding coronal that belongs to another suffix.

(2.27) Palatalization before reflexive

a. ñ-u-xoty-e — from root *-xot* 'hide' (2;125)
b. x-i-ndil-i-ñ-e — from first-person subordinate *-n* (2;1)
c. ñu-unch-e — presumably based on root *unts* 'string'

(2.28) Lack of palatalization before reflexive

a. pa m-a-jants-e n-a-nay jely
to SB-TV-wash-RFL ST-TV-dirty clothes
'in order to wash dirty clothes ' (1;127)

b. dy-a-ngulus-e
PROG-TV-rustle-RFL
'it's making the sound of dry leaves rustling (dim.)' (2;106)

It is not clear what conditions the variation in pre-reflexive palatalization. One possibility is that some palatalizable consonants are "more palatalizable" than others, so to speak: specifically, both of the non-palatalizing examples in (2.28) have a fricative or affricate. There is a sense in which the palatalization of fricatives and affricates is a more drastic change to the identity of the consonant, in that the palatalization is so clearly audible on the consonant itself, as opposed to palatal stops, where the cues to palatalization reside more heavily on the transition into the following vowel. It is not unthinkable that this difference could play into the pre-reflexive palatalization variation, especially given that consonant palatalization is contrastive morpheme-finally. The example in (2.27c) does not have compositional semantics and may be a lexicalized item, not synchronically derived from the root which it appears to be related to. If this hypothesis is borne out, it may be possible to draw a connection to the lack of palatal-glide CV transitions after palatal fricatives and affricates as discussed above.

This hypothesis is at best tentative; I have a few apparent examples of lack of pre-reflexive palatalization on *t* and *l*. However, for various reasons it is difficult to hear palatalization with many of the speakers I work with, so it is probably not appropriate to cite them, pending more careful and systematic investigation of this topic.

To conclude this subsection, some exceptions to the general patterns of onset palatalization must be noted. One set of exceptions, shown in (2.29a-c), consists of words that have plain onsets followed by front vowels. At least one of these is known to be a loanword, but the origins of the others and the reasons why plain consonants are allowed in these are unknown. It is likely that collection of more lexical items will reveal more words that violate the morpheme structure constraints in (2.16). It is also possible that closer phonetic investigation of loanwords will reveal more examples; the fact that all of the exceptions listed involve fricatives or affricates may reflect the relative ease of perceiving the plain/palatal contrast on those segments in comparison with other coronals.

(2.29) Exceptions to allophonic onset palatalization

a. Loanword: Siwisen (< Sp. San Vicente) 'Juchitán' (city)
b Root: -ntsep 'sprout' (2;112)
c. Other: se ko 'although'
d. Ambiguous: xa- (Class 3 first-person possessive prefix), xap (< Sp. jabón) 'soap', xarr (< Sp. jarro) 'jar'

The items in (2.29d) deserve further comment, for which the reader is also referred to §2.6 on loanwords. The ambiguity is that since palatal fricatives and sibilants absorb a following palatal glide on broken-vowel nuclei, it is not clear whether morphemes beginning with *xa-* are underlyingly /xa-/, in violation of the morpheme structure constraints, or /xe-/ with breaking of /e/ to *ia*. The Class 3 possessive prefix (§5.3.2) is probably a bona fide violation, since there is no coda consonant that would provide the environment for breaking, and also since it is inherently nonfinal, meaning that it is never stressed. Another related, apparent violation of the ban on palatal consonants before back vowels comes from concatenations of the progressive prefix *(n)dy-* with the theme vowel *a-*, as illustrated in §6.3.5.

2.2.2 Palatalization in codas

We have now seen that palatalization is either allophonic or nonexistent in onsets, depending on the specific consonant involved. Codas, on the other hand, are the sole context where palatalization is contrastive, robustly so for all consonants. Since there are no medial codas, this amounts to saying that palatalization is contrastive only morpheme-finally. Some minimal and near-minimal pairs of roots exemplifying the contrast on root-final consonants are given in (2.30). The specific rules governing the realizations of the underlying palatalization contrast will be a main topic of this section.

(2.30) Palatalization contrast on root-final consonants

a.	/lal/ lal 'sardina blanca'	g.	/lal^{pal}/ laly 'tiger'
b.	/-ngan/ nangan 'sugar; sweet'	h.	/-ngan^{pal}/ nangañ 'drunk' (n.; adj.)
c.	/-mut/ a-mut 'writes'	i.	/-mut^{pal}/ a-muty 'spies on'
d.	/kants/ kants 'chile'	j.	/kants^{pal}/ kanch 'crab'
e.	/-puk/ a-puk 'hugs'	k.	/puk^{pal}/ puik 'feather'
f.	/-w/ a-w 'goes out, exits'	l.	/-w^{pal}/ a-iw 'borrows'

In consonantal suffixes there are no minimal or near-minimal pairs, because only causative *-(j)ch* and passive *-ch* are palatal, and the rest are plain. Of the plain suffixes, the coronals are prone to variable pre-reflexive palatalization, as mentioned in conjunction with (2.27).

(2.31) Consonant suffixes (incl. mobile affixes) arranged by plain vs. palatal status

a. C suffixes: Stative *-n*, 1st subordinate *-n*, Subordinate *m*, Completive *t*, 2nd person *r*, 1st person *-s*, Plural *-n*, 3rd plural *-f*, 1st inclusive *-r* and *-(j)ts*

b. C^{pal} suffixes: Causative *-(j)ch*, Passive *-ch*

The realization of palatalization differs along two parameters. One is which of three categories the consonant falls into: palatalizable, non-coronal, or rhotic. The other is surface position in the syllable: onset or coda, depending on whether the morpheme-final consonant is also word-final, or whether it is resyllabified and released into the vowel of a following suffix.

As for the realization of the morpheme-final palatalization contrast in resyllabified onsets, the situation is that the following vowel is nearly always epenthetic, and the palatalization contrast manifests itself principally in the choice of front (palatal) or back (plain) quality for the epenthetic vowel. In (2.32), the epenthetic vowels after plain consonants are always back vowels, and the epenthetic vowels after palatalized consonants are always front vowels. The realization rules for the resyllabified onsets are identical to those described above for other onsets.

(2.32) Final-C palatalization contrast manifested in vowel harmony
(all forms shown pre-diphthongization)

	Plain Final C		Palatalized Final C
a.	t-a-j**i**ng-**a**s /-jing/ CP-TV-dance-1 'I danced' (2;9)	f.	t-a-l**i**.j.ch-**i**s /-j.l^{pal}its^{pal}/ CP-TV-fall-1 'I fell' (2;104)
b.	t-a-nd**ia**k-**a**s /-nd^{pal}ek/ CP-TV-speak-1 'I spoke'	g.	t-a-m**e**jm^{pal}-**e**s /-mejm^{pal}/ CP-TV-fan-1 'I fanned (it)' (2;9)
c.	t-a-p**a**k-**a**s /-pak/ CP-TV-liven-1 'I woke up' (in collocation) (2;22)	h.	t-a-w**a**ñ-**i**s /-wan^{pal}/ CP-TV-remove-1 'I removed it' (2;33)
d.	t-a-j.ts**o**k-**o**s /-tsok/ CP-TV-donate-1 'I gave a *cooperación*' (2;33)	i.	t-a-j**o**nch-**i**s /-jonts^{pal}/ CP-TV-comb-1 'I combed (it)' (2;12)
e.	t-a-m**u**t-**u**s /-mut/ CP-TV-write-1 'I wrote (it)' (2;9)	j.	t-a-j.m**ul**^{pal}-**i**s /-j.mul^{pal}/ CP-TV-enter-1 'I went in' (2;33)

Vowel harmony is treated in depth in Chapter 4. To briefly summarize the basic pattern, the epenthetic vowel always matches the preceding consonant for frontness or backness, thereby helping to cue the plain/palatal contrast. It is a copy of the preceding syllable's vowel, wherever this does not cause it to conflict in frontness/backness with the intervening consonant (2.32c-g). If vowel copy would create a conflict (2.32a-b, h-j), a default vowel is inserted instead: *a* after plain consonants, and *i* after palatalized ones. Typologically, then, Huave vowel harmony is a vowel copy process that interacts with front/back features on intervening consonants, which can block the left-to-right propagation of features. (Vowel harmony only exists in suffixes, so either left-to-right directionality or root control could be an accurate characterization, though see §4.2.1 for marginal prefix harmony in some speakers.)

I now turn to the realization of coda (word-final) palatalization on the three groups of consonants. To start with the phonologically palatal variants of the palatalizable coronal consonants, they are realized as palatals word-finally. When the preceding vowel is one of the back vowels {*a o u*} there is some palatalization on the VC transition, but it is weak and inconsistent, and I consider it to be phonetic coarticulation (see §3.2).

(2.33) Word-final palatal coronals following front and back vowels

a.	ñity ‘palm (tree, leaf)’	d.	katy ‘fish’
b.	-mbety ‘price’	e.	toty ‘waist’
c.	tyety ‘father’	f.	uty ‘carbón’

Plain coronals are realized with dental place of articulation word-finally, and also trigger breaking of a preceding front vowel according to the rules in (2.10). Breaking is discussed in further detail in the next section.

(2.34) Word-final plain coronals following front and back vowels

a.	/it/ iot ‘land, earth’	d.	/tat/ tat ‘mangle colorado’
b.	/pet/ piat ‘monte’	e.	/a-not/ a-not ‘s/he pulls it’
c.	/ngwet/ ngwiat ‘ash, chalk’	f.	/a-mut/ a-mut ‘s/he writes it’

Non-coronal consonants{*p mb k ng kw ngw m w j*}, i.e. all of the non-palatalizable consonants apart from rhotics, display the same strategies for realizing the plain/palatal contrast word-finally in a front-vowel context. When non-coronal consonants are preceded by one of the front vowels {*i e*}, phonologically palatalized variants (C^{pal}) are realized as plain, with no modification to the vowel (2.36a-c). The frontness of the vowel is itself a cue that the final consonant is phonologically palatalized, since only coda C^{pal} can preserve a preceding vowel as monophthongally front in word-final syllables. In contrast, word-final plain consonants (C), trigger breaking of a preceding front vowel, as was shown above for coronals and is shown in (2.35a-c) for non-coronals.

(2.35) Word-final plain non-coronals following front and back vowels

a.	/mik/ miok 'bat (animal)'	d.	/lak/ lak 'with'
b.	/chik/ chiok 'mojarra blanca'	e.	/ndok/ ndok 'fishing net'
c.	/tek/ tiak 'caporal'	f.	/tyuk/ tyuk 'petate'

(2.36) Word-final palatalized non-coronals following front and back vowels

a.	/mik^{pal}/ mik 'monkey'	d.	/u-lak^{pal}/ ulaik 'his/her teeth'
b.	/a-j.chik^{pal}/ a-j.chik 's/he jumps'	e.	/ok^{pal}/ oik 'cloud'
c.	/pek^{pal}/ pek 'shoulder'	f.	/ndyuk^{pal}/ ndyuik 'ocean'

The strategies are slightly different when the preceding vowel is one of the back vowels {*a o u*}. Plain consonants (C) are realized as plain with no modification to either vowel or consonants (2.35d-f). For phonological C^{pal}, on the other hand, palatalization is realized not on the final consonant itself, but as a prominent palatal offglide on the preceding vowel (2.36d-f). This creates falling diphthongs {*ai oi ui*} through the process of Consonant Fission, as discussed further in §2.2.4 as well as in Chapter 3. Diphthongization is the analog of the phonetically coarticulated VC transitions in the case of palatalizable coronals as in (2.33d-f); a connection can be drawn between the inability to realize palatalization on non-coronals, and the concomitantly stronger palatalization cues on the preceding vowel nucleus.

The third and last set of palatalization realization strategies is displayed by rhotics. With front vowels {*i e*}, I have no attestations of root-final palatalized rhotics that actually ever appear word-finally; all rhotic-final roots with front vowels undergo vowel breaking when word-final, indicating the phonologically plain status of the rhotic. The only root-final rhotic in my database that follows a front vowel is *jiry-* 'scatter, go to pieces', but it never appears word-finally since its basic form is a suffixing root, and its transitive form carries the causative suffix.

Rhotics are nevertheless like other consonants in that they contrast phonologically for plain versus palatalized, though apparently only when the root vowel is back {*a o u*}. The other major difference from other consonants is that in terms of surface realization, the plain/palatal contrast is neutralized word-finally; comparing (2.37a) and (2.37c), we see that palatalization simply finds no phonetic expression.

Evidence for the contrast emerges only upon suffixation, when the quality of the epenthetic vowel reflects the plain or palatal status of the root-final rhotic. After the root in (2.37b), which ends in the plain rhotic, we get a back vowel. After the root in (2.37d), which ends in a phonologically palatalized rhotic, we get a front vowel. Comparing the examples in (2.37f) and (2.37g) we see that the difference exists for trills as well, not just taps (although I do not know of a prefixing root ending in a palatalized trill, which would fill in the currently blank lower left cell of the table).

(2.37) Plain and palatalized rhotics

a.	dy-a-ntsor /-ntsor/ PROG-TV-bark '[the dog] is barking' (2;107)	b.	ndyu-m-a-ntsor-**o**j PROG-SB-TV-bark-3PL '[dogs] are barking' (1;169)
c.	l-a-j.tsor /-tsor^{pal}/ PF-TV-go.home 'S/he's gone home' (1;122)	d.	l-a-j.tsor-iuf /l-a-j.tsor^{pal}-**i**jw/ PF-TV-go.home-3PL 'They've gone home' (2;92)
e.	m-u-jorr /-jorr/ SB-TV-shave '(that) s/he shaves it' (2;76)	f.	t-a-jorr-os CP-TV-scrape-1 'I scraped it' (2;76)
	---	g.	parr-io-m /parr^{pal}-**i**-m/ split-V-SB '(that) it splits' (3;56)

We have now seen three sets of strategies for the realization of the palatalization contrast. The phonological representations C and C^{pal} which attribute this contrast to word-final consonants have been chosen as a way to unify the manifestations of plainness and palatality, all of which appear either on the final consonant or on an adjacent vowel nucleus. An alternative analysis is to attribute the relevant contrasts to a "palatal prosody," a floating palatality feature lexically specified on morphemes and realized in various locations according to context-specific association rules/constraints. An advantage of this analysis is that it does not privilege the consonant itself over the other attested loci of realization. One disadvantage is that it has no explanation for why vowel-final roots (CV) display no palatality contrast, whereas saying that the contrast resides on morpheme-final consonants provides a natural explanation for why it does not exist when there is no final consonant. In general, the reason I have not pursued the "palatal prosody" analysis here is that it is more abstract than the C/C^{pal} one, without any differences in prediction that I have been able to deduce, aside from the incorrect prediction of a contrast on CV roots. However, because the idea has not yet been fully explored, it may well prove to be fruitful in future research.

2.2.3 Vowel breaking

In this and the next subsection I provide evidence for the processes of Vowel Breaking and Consonant Fission that have been posited to derive surface diphthongs, rising and falling respectively, from underlying monophthongs. The choice not to consider the diphthongs as underlying, and to identify them with independently attested monophthongs, involves some degree of phonological abstractness, which can be justified through three lines of evidence: distributional gaps, phonological behavior of diphthongs, and synchronic alternations between diphthongs and their corresponding monophthongs. I will first go through the motivation for vowel breaking, then the motivation for consonant fission.

As we have seen, vowel breaking creates diphthongs from underlying front vowels /i/ and /e/ before plain coda consonants. The breaking rules are reproduced in (2.38) from their initial presentation in (2.10).

(2.38) Vowel Breaking

a. /i/ ➝ iu [ju] before [+s.g.] coda or vowel aspiration in closed syllables
b. /i/ ➝ io [jo] before all other plain codas
c. /e/ ➝ ia [ja] before plain codas

In (2.39) are some examples of words with rising diphthongs. A null hypothesis might be to posit underlying back vowels in these words, and attribute the glide to secondary palatalization on the onset, as in the hypothetical underlying forms listed. At first glance this is not unreasonable, given the independent existence of palatalization as a phonological force in the language. However, the "surfacy" analysis creates problems.

(2.39) Back vowels as underlying?

a.	xiol 'tree, wood'	/s^{pal}ol/ ?
b.	miok 'bat'	/m^{pal}ok/ ?
c.	piats 'tortilla'	/p^{pal}ats/ ?
d.	a-ndiak 's/he speaks'	/a-nd^{pal}ak/ ?

The first set of problems has to do with distributional phonotactic facts, as originally noticed by Noyer (2003). If we adopt the types of representations in (2.39), a couple of generalizations emerge over monosyllabic roots in the lexicon. First, we notice a pair of gaps: roots beginning in presumed /C^{pal}a-/ and /C^{pal}o-/ can only be closed by a plain consonant, never a palatalized one. This has no immediately apparent explanation: it cannot be a cooccurrence restriction on VC# sequences, since /Ca-/ and /Co-/ roots (with plain onsets) freely combine with both plain and palatalized codas. Meanwhile, in a mirror-image gap, front-vowel roots beginning in /C^{pal}i-/ and /C^{pal}e-/ can only be closed by a palatalized consonant, never a plain one. The full combinatorial possibilities for roots with initial C^{pal} is shown in the chart in (2.40), filled in with what would superficially seem to be corresponding forms.

(2.40) Superficial phonotactics

	i	e	u	o	a
C^{pal}VC	--	--	tyum 'throat'	tiok 'hill'	-ndiak 'speak'
C^{pal}VC^{pal}	xix 'sandfly'	xex 'bowl'	ndyuik 'sea'	--	--

On the vowel breaking analysis, however, superficial C^{pal}oC and C^{pal}aC are underlyingly /C^{pal}iC/ and /C^{pal}eC/, respectively. The roots in the former categories in (2.40) are shifted to the latter in the revised chart in (2.41). The pattern that emerges is that C^{pal} initials are permitted before front and high vowels only, and they combine freely with both C and C^{pal} finals. The gaps on the right-hand side of the chart are now principled: roots of these shapes do not exist due to a morpheme structure constraint banning C^{pal} initials before back nonhigh vowels.

(2.41) Underlying phonotactics

	i	e	u	o	a
C^{pal}VC	*tiok 'hill'*	*-ndiak 'speak'*	tyum 'throat'	X	X
C^{pal}VC^{pal}	xix 'sandfly'	xex 'bowl'	ndyuik 'sea'	--	--

For comparison, I give the corresponding chart for CVC roots with plain C initials. It reflects morpheme structure constraints that interlock with the ones illustrated in (2.16): plain initial C is permitted only before back nonhigh vowels (for consonants that allow palatal variants in initial position, i.e. the palatalizable coronals). On the other hand, it does not make sense in conjunction with the superficial analysis shown in (2.39). The fact that the vowel breaking analysis causes this set of phonotactic facts to fall together neatly is one piece of supporting evidence for it.

(2.42) Initial plain (coronal) C

	i	e	u	o	a
CVC	--	--	--	ndok 'net'	tants 'goat'
CVC^{pal}	--	--	--	toty 'waist'	ndax 'chicle'

I will note in passing a few exceptions to the morpheme structure constraints, namely roots of the superficial form $C^{pal}aC^{pal}$ and $C^{pal}oC$, which it appears must also be analyzed as underlyingly $C^{pal}aC^{pal}$ and $C^{pal}oC$, respectively. The words in (2.43ab) cannot have underlying /e/, because final C^{pal} means that the environment for breaking does not obtain and so there is no independently motivated way to obtain the surface vowel. The word in (2.43a) is likely a loan from Spanish, though the change of *e* > *a* subsequent to borrowing is obscure. The words in (2.43bc) were presumably borrowed with an added final front vowel, which turned into palatalization upon the general loss of final vowels; see §3.5. The root in (2.43d) is notable because vowel harmony, i.e. the epenthetic vowel *o* in the first-person suffix *-os*, shows the root to have a genuine mid round back vowel. Speakers reject forms with an epenthetic vowel *a* (4;12).

(2.43) Possible exceptions

a. ñañ 'baby' (< Sp. nene?)
b. chaly 'rebozo' (< PHu. *chali < Sp. chal)
c. lyaiw 'key' (< Sp. *llave*)
d. t-a-tiots-os 'I thought' (4;12)
CP-TV-think-1

There is another set of distributional phonotactic facts that is puzzling under the superficial analysis, but which the vowel breaking analysis is able to bring order and principle to. This has to do with the distribution of what appear to be secondarily palatalized non-coronals and rhotics. As illustrated in (2.44), these seem to occur only before the back nonhigh vowels {*a o*}, an unnatural pattern since these are exactly the phonetic contexts which are *not* conducive to palatalization. In the case of the front vowels, an argument might be made for dissimilatory factors at work in the failure of palatal offglides to occur before {*i e*}, but it is less plausible in the case of *u*. (An oversimplication is the exclusion of *Ciu*-, which occurs before voiceless fricatives only and is, under my analysis, to be identified with the *Cio*- roots, which can end in any plain consonant except for voiceless fricatives.)

(2.44) Superficial (incorrect) phonemic analyses, non-coronals

a. miok 'bat' /m^{pal}ok/
b. -jior 'have' /j^{pal}or/
c. piats 'tortilla' /p^{pal}ats/
d. ngwiat 'ash' /ngw^{pal}at/
e. But: *m^{pal}e, *m^{pal}u, *p^{pal}e, *p^{pal}u, etc.

We have already seen in §2.2.1 that non-coronals and rhotics fail to palatalize in synchronic alternations such as before the theme vowel *u*-, and in diminutivization. This is another instance of the same issue: if secondarily palatalizated non-coronals and rhotics are available in onset position, it is not clear why they would be restricted to the contexts least favorable to palatalization. Under the superficial analysis, it is not just that the back nonhigh vowels {*a o*} permit a wider range of palatalized onsets; they are the only context in which onset palatalization would be contrastive, since there are also "obviously plain" non-coronals in onset position.

The puzzle in the previous two example sets is resolved under the vowel breaking analysis: apparent secondary palatalization on non-coronals and rhotics is not part of the onset at all, but belong to the diphthongized vowel nucleus. The consonants themselves are phonologically plain. Thus we arrive at the generalizations that have already been presented in (2.16): only the "palatalizable" consonants can be palatalized in onsets, and that only allophonically, before front and high vowels.

This concludes the evidence from phonotactic distributions in support of the vowel breaking analysis. A second line of argumentation comes from the phonological behavior of the broken diphthongs, at least those from /i/. Specifically, the back rounded vowels in *Cio-* and *Ciu-* do not pattern with the corresponding back rounded vowels in *Co-* and *Cu-* contexts with regard to the processes of labial dissimilation and vowel harmony. The nonapplication of expected phonology casts doubt on the hypothesis that the former set are phonologically back vowels. Since these processes involved are not described until later in the chapter, and since their details are not crucial to the current argument, I will limit myself merely to summarizing the nature of the differences in behavior. I note that this is a case of underapplication opacity.

Labial dissimilation prohibits tautosyllabic sequences of the labial glide *w* before or after the round vowels *u* or *o*. Where a round vowel and coda *w* meet by morpheme concatenation, the *w* coda fails to surface. In (2.45ac), vowel harmony rules create round vowels before a suffix *w*, and dissimilatory deletion is observed. However, in (2.45cd), *io* occurs with labial-glide codas, in morphologically derived forms parallel to those in (2.45ab). If these diphthongs come from underlying /i/, which is not round, the underapplication of labial dissimilation is more easily understood (theoretical opacity-related concerns notwithstanding). In (2.46) are a couple of examples of lexical items containing surface round vowels before labial-glide codas, despite the fact that round vowels never otherwise (i.e. in words with unambiguously plain onsets) occur with labial-glide codas; these apparent exceptions are explained by the fact that the vowels in (2.46) are on some phonological level not actually round.

(2.45) Application and non-application of labial dissimilation

a.	/la mojk-o-w/ ➔ la mojk-o-Ø PF face.down-V-ITR ‘s/he’s now lying face down’ (2;94)	c.	/la sojnd^{pal}-i-w/ ➔ la sojnd-io-w PF pull.out-V-ITR ‘ya se arrancó’ (3;60)
b.	/t-a-mbul-ujw/ ➔ t-a-mbul-uj CP-TV-help-3PL ‘(that) they help’ (1;91)	d.	/m-a-tsand^{pal}-ijw/ ➔ m-a-tsand-iuf SB-TV-hit-3PL ‘(that) they play music’ (2;41)

(2.46) Surface violations of *-ow#, *-uw#

a. piow ‘robalo’
b. piuf ‘zapotillo amarillo’

Another way in which *io* and *iu* nuclei behave differently from *o* and *u* shows up in forms where *io* and *iu* occur in nonfinal syllables due to the possibility for cyclic application of vowel breaking (see also §3.6, §4.6.2). In (2.47ab) we see round vowels *o* and *u* triggering identical vowel quality on the respective epenthetic vowels that follow them. But in otherwise comparable contexts with rising diphthongs, shown in (2.47cd), vowel harmony produces different vowels. Again, if the diphthongs are underlyingly /i/, the non-round status of the epenthetic vowel can be explained.

(2.47) Round vowels in vowel harmony

	-us-un/-os-on		-as-an
a.	t-a-nchum-us-un CP-TV-paint-1-PL ‘we (excl.) painted it’ (2;99)	c.	t-a-kiujp-as-an mion CP-TV-bring-1-PL from ‘we (excl.) brought it’ (1;171)
b.	t-a-mbol-os-on CP-TV-fear-1-PL ‘we (excl.) were afraid’ (2;99)	d.	t-a-miok-as-an CP-TV-lower-1-PL ‘we (excl.) lowered it’ (2;99)

In sum, we have seen that *Cio-*, *Ciu-*, and *Cia-* syllables may look like sequences of palatalized consonant plus back vowel, but this does not appear to be the correct phonological analysis. Now, we will see some synchronic alternations which cement the idea that *io* and *iu* come from underlying /i/, and *ia* from underlying /e/.

The basic idea of these alternations is that the same segment surfaces is diphthongal when the environment for breaking (closed syllable with plain coda) is met, but monophthongal when it is not. One version of this is that when suffixes are added, a syllable that is final in one form (the left column of (2.48)) will be nonfinal in another (the right column of (2.48)), as a consequence its final consonant will be resyllabified into the onset of the following, suffixal syllable. With no surface coda consonant to trigger breaking, nonfinal instantiations of the vowel can surface in their underlying monophthongal form. In (2.48) we can see that this alternation happens with root vowels (2.48ab) and epenthetic suffix vowels (2.48cde) alike; (2.48ej) are a special case of a front vowel whose unstressed, nonfinal status is not directly due to the concatenation of suffixes, but to the prefixal versus suffixal status of the morpheme (see Chapter 7; this is a special case within the general phenomenon of mobile affixation).

(2.48) Vowel breaking alternations

	Final		Nonfinal
a.	k-a-j**io**r G-TV-have 'has' (2;105)	f.	i-j**i**r-e 2-have-RF 'Take care of yourself.' (2;104)
b.	u-m**ia**jts POS1-heart 'its heart' (1;139)	g.	u-m**e**jts-aw (*umijtsaw*) POS1-heart-3PL 'their hearts' (3;27)
c.	t-a-xijp-**iu**s CP-TV-bathe-1 'I bathed' (1;148)	h.	t-a-xijp-**i**s-an (*taxijpesan*) CP-TV-bathe-1-PL 'We (excl.) bathed' (1;148)
d.	wejk-**ia**-t be.born-V-CP 's/he was born' (1;163)	i.	wejk-**e**-t-u-s (*wijkitus*) be.born-V-CP-ITR-1 'I was born' (2;101)
e.	chut-u-m-**ia**-r sit-V-SB-2-2I '(that) you (sg.) sit' (2;4)	j.	t-**e**-chut-u-r CP-2-sit-V-2I 'you (sg.) sat' (2;5)

Vowel-final roots provide more examples of monophthong/diphthong alternations. The root *-tye-* 'hang' is one of the roots in the language that can be either prefixing or suffixing, depending on intended argument structure (§6.4.4). When it is suffixing, the addition of a single-consonant suffix as in (2.49a) closes the syllable and creates the conditions for breaking of underlying /e/. When it is prefixing, there is the possibility of root-final forms, which have no coda consonant and permit the vowel to surface as monophthongal. The verb form in (2.49b) is also built on a CV- suffixing root which breaks its underlying front vowel when a plain consonantal suffix is added. (Note that the suffix in question is a mobile affix, which can be palatalized by a following vowel as shown in (2.22)). This case shows that a preceding vowel has no power to palatalize it.) Although this root cannot occur as a prefixing root, the example in (2.49d) shows surfacing of the underlying vowel quality in a non-final syllable.[1]

(2.49) Vowel-final suffixing roots

a.	al=tia-m /al t^{pal}e-m/ DUR=hang-SB 'It's hanging, spread out' (2;110)	c.	ñ-u-tye ST-TV-hang 'hung/spread out' (2;109)
b.	x-i-pia-n /x-i-pej-n/ 1-FT-lie-1SB 'I will lie down' (1;164)	d.	pej-t-u-s lie-CP-ITR-1 'I laid down' (1;109)

It is not only the presence or absence of the closed-syllable condition on vowel breaking that creates alternations. In (2.50) are examples of words built on single-consonant roots. The second-person prefixes *i* and *e* are normally not in final syllables because they are prefixes, and most roots consist of at least one syllable. Unsuffixed single-consonant roots are the one context where these prefixes occur in a closed

[1] These examples create an interesting feature-specification paradox with respect to the analysis in Chapter 3; see §3.6 for discussion.

syllable, and can therefore alternate. When a single-consonant root is phonologically palatalized, as in (2.50a-c), the second-person prefixes surface as monophthongs. However, when the root is plain, the prefixes undergo vowel breaking, as in (2.50d-f).

(2.50) 2nd person prefixes with single-consonant roots

	C^{pal} root		C root
a.	i-w 2-borrow (2;67)	d.	io-m 2-go (1;133)
b.	t-e-ty CP-2-eat (1;95)	e.	t-ia-m CP-2-go (1;124)
c.	m-e-jch SB-2-give (3;65)	f.	m-ia-m SB-2-go (2;104)

One logical possibility that has not yet been considered is that that the relationship between front vowels and rising diphthongs is the opposite to what has been presented here: the diphthongs *io* and *ia* are underlying, and the front vowels *i* and *e* are derived from them via a phonological process of monophthongization. On this idea, the greater amount of vocalic material in diphthongs is licensed only in stressed syllables, where there is sufficient duration to realize all of it (see e.g. Zhang 2001). However, in the Huave case this analysis runs into the basic problem that the diphthongs appear in a single type of environment (before plain codas) and the front vowels appearing elsewhere (in open syllables, before palatal codas). The selection of diphthongs as underlying would thus contradict general principles for the diagnosis of underlying forms, and the analysis becomes clunkier in that separate (and differently motivated) monophthongization rules must be posited for each context rather than a single set of diphthongization rules for a single context. Additionally, if diphthongs were underlying, the vowel inventory would look highly unusual, consisting of three back vowels and the diphthongs, with no front vowels at all.

2.2.4 Consonant fission

To establish that the underlying vowel inventory of Huave contains only monophthongs, it remains to be shown that all instances of falling diphthongs {*ui oi ai*} result from Consonant Fission, i.e. the realization of palatalization features on an underlyingly monophthongal back-vowel nucleus {*u o a*}. Two brief arguments can be given here. The first comes from phonotactics. If {*ui oi ai*} were independent diphthongs, we would expect them to cooccur freely with coda consonants. However, they never occur before palatalizable coronals. They are only found with consonants whose phonological palatalization cannot be realized on the consonant itself.

(2.51) No falling diphthongs before coronals

a. *uit, *uity, *uin, *uiñ, *uis, *uix, etc.
b. *oit, *oity, *oin, *oiñ, *ois, *oix, etc.
c. *ait, *aity, *ain, *aiñ, *ais, *aix, etc.

The other argument comes from alternations. When suffixes are added to a root with a *ui*, *oi* or *ai* diphthong, the palatal offglide disappears; the palatalization manifests itself in the front status of the epenthetic vowel introduced by the suffix.

(2.52) Fission alternations[2]

a.	i-laik /i-lak^{pal}/ 2-tooth 'your (sg.) tooth' (1;173)	b.	i-lak-ion /i-lak^{pal}-in/ 2-tooth-PL 'your (pl.) tooth' (1;173)
c.	n-a-naijp /n-a-najp^{pal}/ 1SB-TV-sell '(that) I sell (it)' (060131-Ep1)	d.	t-a-najp-ius /t-a-najp^{pal}-is/ CP-TV-sell-1 'I sold (it)' (060131-Ep1)
e.	x-i-n-a-loing /x-i-n-a-long^{pal}/ 1-FT-1SB-TV-hang 'I'll hang it up' (1;131)	f.	a-long-iuf /a-long^{pal}-if/ TV-hang-3PL 'they hang (it)' (2;30)
g.	i-ndoijk /i-ndojk^{pal}/ 2-cut 'Cut it!' (3;56)	h.	ndojk-io-t /ndojk^{pal}-i-t/ cut-V-CP '[The string] broke.' (2;18)

[2] I do not have any verb roots in my data (or suffixed nouns) that end in -*u*C^{pal}, where C is non-coronal, so the examples are restricted to *a* and *o*.

A complicating factor in the analysis of Vowel Breaking and Consonant Fission is that although it is obligatory in final syllables where the environment obtains, it also happens optionally in non-final syllables where an underlying vowel is followed by a morpheme- (rather than word-) final consonant that would condition diphthongization, were it a tautosyllabic coda. The issue is that on the surface, these consonants have been syllabified into the onset of the next syllable, so the rules proposed so far do not account for the diphthongs. For all the examples in (2.53), there is some morphologically related form of the word where the diphthongized vowel occurs in a word-final syllable. In §3.6 I discuss some possible approaches to this problem, but a full analysis remains a topic for future research. It is not clear what segmental, metrical, or other factors favor diphthongization in these contexts where it is optional. Also, the falling diphthong *ai* seems impressionistically to occur in a greater percentage of the non-final contexts where it would be possible, as compared with *oi*.

(2.53) Optional diphthongization in non-final syllables

a.	t-a-mbiol-af CP-TV-roll-3PL 'they rolled it up' (1;175)	g.	t-a-laip-ius /t-a-lap^{pal}-is/ CP-TV-lick-1 'I licked it' (3;96)
b.	chiuj-t-u-s-un /chij-t-u-s-un/ calm-TV-ITR-1-PL 'we (excl.) calmed down' (2;2)	h.	t-a-laing-ius /t-a-lang^{pal}-is/ CP-TV-cross-1 'I crossed over' (3;89)
c.	t-a-t-ius-an /t-a-t^{pal}-is-an/ CP-TV-eat-1-PL 'We (excl.) ate it' (1;95)	i.	a-loing-ioran /a-long^{pal}-iran/ TV-hang-PASS 'it was hung up' (2;118)
d.	m-a-ndiak-af /m-a-ndek-af/ SB-TV-speak-3PL '(that) they speak' (2;2)	j.	t-a-loim-ius /t-a-lom^{pal}-is/ CP-TV-destripar-1 'lo destripé' (4;12)
e.	piaj-u-s /pej-u-s/ lie-ITR-1 'I lie down' (1;165)		
f.	wejk-ia-t-u-s /wejk-e-t-u-s/ be.born-V-CP-ITR-1 'I was born' (1;163)		

2.2.5 Other positional and combinatorial restrictions

Even aside from the phonotactic restrictions just described, not all conceivable CVC roots are attested, and there are some patterns in the gaps as well as in the set of combinations that is underrepresented. A thorough study of positional and combinatorial restrictions has yet to be undertaken, but a few observations can be made.

Not all consonants occur freely in both initial and final position in CVC roots. Labiovelars are found only in onsets; there are no morpheme-final or coda labiovelars in my data so far. The question of whether there are other consonants that are rare or nonoccurring in root-initial or root-final position remains to be investigated. For example, roots ending in *s* and plain *t* seem infrequent relative to others. It is not known whether there are restrictions on the medial consonant in disyllabic CVCVC roots, or on the sets of consonants that can cooccur within a root.

As for restrictions on CV and VC combinations, Huave has a general disaffinity for rhotics adjacent to high vowels and palatal glides. There is a conspiracy to (largely) prevent such sequences on the surface: underlying */rr^{pal}i-/ and */-irr^{pal}/ are absent, although there are /-irr/ roots like *-tiorr* that undergo breaking. As shown in (2.37), roots with /-Vr^{pal}/ and /-Vrr^{pal}/, where V is a back vowel, do not create falling diphthongs (preventing a coda rhotic after palatal offglide) even at the cost of contrast neutralization. Trills reduce to taps adjacent to high vowels {*i u*} that are created in diminutivization (§6.5.2), although roots with lexical *rru-* and *-urr* are attested (if rare). There do not seem to /-err^{pal}/ roots, although there are a couple starting in /rre-/.

Glides do not occur tautosyllabically with homorganic vowels: *yi, *ye, *iy], *ey], *wu, *wo, *uw, *ow. For more, see §2.4.

There are some restrictions on voiceless fricatives *j* (both consonantal *j* and vowel aspiration), *s* and *x*, which interface with active alternations as described in §2.5.1 as well as with static morpheme structure constraints. There are no roots of the form *jVj(C)* aside from the onomatopoeic *-joj* 'cough' (same as in the San Mateo dialect, as pointed out by Noyer 2003). Aspirated vowels do not occur before voiceless fricatives (**js*, **jx*) in any context. They are also prohibited from surfacing before tautosyllabic voiced consonants (§2.5.3).

A majority of disyllabic roots, as listed in §5.1 and §5.3.1, have identical vowels in their two syllables, which cannot be an accident. The idea that this was once an active part of the phonology is supported by "vowel leveling" in Spanish loanwords that originally had different vowels in adjacent syllables, discussed in §2.6. There is evidence of both progressive and regressive leveling, but there is currently too little data to attempt a more nuanced analysis based on e.g. metrics. Although vowel leveling does not operate in newer loans, an open question is what combinations of vowels are permissible in native words and older loans. Presumably, there are some restrictions on the combinations of non-identical vowels that can occur in disyllabic roots.

2.2.6 Hiatus

Although morpheme-internal sequences of vowels are not found in native vocabulary, Huave has very high tolerance for vowel hiatus that arises through morpheme concatenation. Hiatus arises when a vowel-final prefix attaches to a vowel-initial root, or when a vowel-initial suffix attaches to a vowel-final root. Morpheme-internal hiatus does arise in one specific circumstance, namely glide vocalization upon suffixation.

(2.54) Hiatus-creating morphology

a. Vocalic/vowel-final prefixes: Theme vowel *a-* or *u-* (Stem); 2nd person *i-/e-* (Layer 1); Class 3 Possessive *xa-*, *mi-*, Progressive *ndyu-*

b. Vocalic suffixes: Intransitive [+round] (Layer 1), Reflexive *-e* (Layer 2)

A table of all possible vowel-vowel sequences with attested examples is given in (2.55). Most sequences are allowed, but there are some gaps. A few of them (i-e, o-i, o-a, u-i, u-e), are likely to be accidental gaps; no *i-* or *u*-final roots have been found with the reflexive suffix so far, no cases of *y*-vocalization after round vowels in a non-breaking context have been found so far, and there do not seem to be any morphological contexts that could give rise to an *o-a* sequence. As for *e-i*, *e-o* and *e-u*, they exist morphologically - one need only add a subordinate, completive or stative prefix to the words in the top row to bring about the second-person allomorph switch from *i-* to *e-* (§6.1.2), but due to vowel reduction these are still usually pronounced with [i] rather than [e]. I do not know whether the lack of phonetic [e]-initial hiatus sequences in my data is an accident due to the high percentage frequency of vowel reduction of unstressed *e* to [i], or if the hiatus context specifically requires reduction to avoid [e]-initial hiatus. There is no special reason to think the latter, but caution seems appropriate given the lack of such phonetic sequences in available transcribed data.

The only apparent instance of hiatus resolution is with *e-a* hiatus, repaired by palatal-glide insertion in the morphological contexts discussed in conjunction with (2.67). However, *e-a* hiatus due to concatenation of the second-person morpheme with a vowel-initial root is absent in the same way as it is for *e-i*, *e-o* and *e-u*.

The *o-u* gap is due to the fact that morphologically, such a sequence could only arise via concatenation of the intransitive [+round] suffix to an *o*-final base. However, in those situations the [+round] suffix surfaces as mid instead of high, matching the final vowel of the base, as in (2.56a). On the other hand, phonetic instances of *o-u* hiatus are found due to optional vowel breaking in unstressed syllables, as in (2.56b).

(2.55) Attested vowel-vowel sequences

	i	e	a	o	u
i	i-ix 2-nauseous (3;44)	?	i-ay 2-weave (3;44)	i-ol 2-stir (2;72)	i-uñ 2-buy (3;44)
e	(Reduction?)	dy-a-mbe-e PROG-TV-fuss-RF (2;45)	(Glide insertion, §2.4.2)	(Reduction?)	(Reduction?)
a	a-ix TV-nauseous (2;33)	t-a-eñ CP-TV-be.eaten.with (3;103)	xa-ap 1POS-in.law (3;44)	t-a-ojty CP-TV-dig (A Lom)	s-a-ujp 1-TV-smoke (3;43)
o	?	ndy-a-joy.jo-e PROG-TV-sway-RF (2;75)	?	mi-no-oj POS-husband-3PL (3;25)	X (Harmony)
u	?	?	l-a-ndyu-af PF-TV-die-3PL (3;41)	ñ-u-oly ST-TV-tie (1;100)	chut-u-u-s sit-V-ITR-1 (3;45)

(2.56) *o-u* hiatus possibilities and lack thereof

a. la=mojk-o-o-s
PF=face.down-V-ITR-1
'I'm now lying face down.' (2;99)

b. la=wit-io-u-s
PF=rise-V-ITR-1
'I've gotten up.' (1;162)

As seen in (2.57), sequences of two identical vowels are tolerated, provided that the second is stressed. There is a clear syllable break between them; the syllables are distinguished through the alignment of an intonational event on the stressed syllable. In very careful speech during elicitation I have one example of a glottal stop being inserted between two identical vowels, but none of my other similar tokens show this.

On the other hand, sequences of adjacent identical vowels in unstressed syllables are more difficult to differentiate. In words like (2.57a) there is a small movement in pitch and/or intensity onto what may be a secondarily stressed syllable such that the vowels are distinguishable. In some cases, though, they collapse into a vowel of conspicuously long duration such that both of the identical vowels can be said to still be there. At other times they collapse into a single vowel that does not sound longer than a normal unstressed short vowel. All of these cases need to be investigated instrumentally. The obligatoriness versus optionality of shortening with regard to morphological constituency should also be investigated.

(2.57) Identical vowel sequences in unstressed syllables

a. s-a-ajch-ion
1-TV-chop-PL
'we chop (firewood)' (3;88)

b. t-a-ay-ius → ta:yus
CP-TV-weave-1
'we (excl.) weaved it' (3;44)

c. la=mojk-o-o-s-on → la mojkoson
PF=face.down-V-ITR-1-PL
'we (excl.) are now lying face down' (2;99)

d. ti-i-mbas → timbas
LOC-2-front
'your (sg.) forehead' (2;7)

See §6.1.5 for discussion of vowel deletion in the perfect particle *la* and the progressive prefix *dyu-* when they are preposed to bases beginning with the second-person prefix *i-*.

2.3 Segmental processes

2.3.1 Final stop deletion

Word-finally, the stop phase of a prenasalized stop is obligatorily deleted. Upon suffixation, the stop phase is allowed to surface and released into the following vowel.

This creates morphophonological alternations between final nasals and nonfinal prenasalized stops. As a comparative note, the San Mateo dialect has this alternation with *ng*, but with *mb* and *nd* the stop phases are realized in all environments. Noyer (2003) observes based on Radin's (1929) transcriptions of the San Dionisio dialect that there may be some compensatory lengthening upon deletion of the stop phase word-finally; this should be examined phonetically.

(2.58) Final stop phase deletion in prenasalized stops

a.	t-a-jim CP-TV-sweep 'she sweeps' (3;45)	b.	t-a-jimb-iuf CP-TV-sweep-3PL 'They go' (3;45)
c.	n-a-ion 1SB-TV-endure '(that) we endure it' (3;46)	d.	n-a-iond-an 1SB-TV-endure-PL '(that) we endure it' (3;46)
e.	a-rang [araŋ] TV-do 'S/he does it' (2;65)	f.	a-rang-af [araŋgaɸ] TV-do-3PL 'They do it' (2;65)

A related process is the variable deletion of word-final stops after aspirated vowels. This also creates consonantal alternations between non-suffixed and suffixed forms, with the interesting twist that the stop is not necessarily predictable based on the non-suffixed forms in the same way it can be predicted in (2.58) from the place of articulation of the final nasal. Post-aspirate word-final stop deletion seems to be obligatory in a certain small set of common words for all of the male speakers I have worked with, while it is more variable among women. Nevertheless, there are many roots which seem unable to undergo this process. In general, post-aspirate deletion is most robust with final velars. Nouns that do not take suffixes (i.e. are not typically possessed) tend not to delete final stops, although there are some exceptions.

(2.59) Post-aspirate final consonant deletion

a.	xi-ñuj(k) 3POS-eye 'my eye' (1;84, 2;7)	b.	u-ñujk-aw 3POS-eye-3PL 'their eyes' (2;7)
c.	a-lyej(k) TV-open 'S/he opens it'	d.	lejk-ia-n open-TV-ST 'It's open'
e.	matsaj(t) 'pineapple' (1;84)	f.	nchiaj(k) 'squirrel' (3;41, 3;53)
g.	sa-kiuj 1POS2-friend 'my friend' (1;113)	h.	sa-kiujp-aw 1POS2-friend-3PL 'my friends' (1;121)

2.3.2 Degemination and cluster simplification

The Huave ban on geminate consonants manifests itself not only as a morpheme structure constraint, but also as an active process of degemination that occurs across morpheme and word boundaries. In (2.60a), the durative particle *al* creates a potential geminate when concatenated with *l*-initial roots, but only a singleton surfaces. Also, the conditions for degemination are created upon full reduplication of CVC roots that start and end with the same consonant, as in (2.60b). We cannot be completely sure that any particular case is partial rather than full reduplication, but we might infer that this is a context for degemination from the fact that reduplication never results in a geminate.

(2.60) Degemination

a. al=long-io-m → alongiom
DUR=hang-V-SB
'It is hanging.' (2;12)

b. i-taj.tajt
2-shake.RED
'Shake it!' (2;65)

In (2.61) are examples of degemination between fully independent words, which show that it applies between constituents that do not have as tight a morphosyntactic relationship as in the previous examples. Degemination is attested even in slow and relatively careful speech; the open issue is whether there are syntactic or prosodic contexts where degemination either does not occur or is optional.

(2.61) Degemination across word boundaries

a. par t-a-mb-a**n** **n**-a-yak Siwisen → par tamba **n**ayak Siwisen
to CP-TV-go-PL 1SB-TV-put Juchitán
'We (excl.) went and I put [them] in Juchitán' (060131-Ep1)

b. jang m-a-**m** **m**-a-naijp ñu → jang ma **m**anaijp ñu
who SB-TV-go SB-TV-sell it
'someone to go sell it' (060131-Ep3)

In compounds and common collocations, there is reduction of the consonant "cluster" that arises across the word boundary. In (2.62a-c), the initial consonant of the second noun is lost; in the first two examples, the final consonant of the first noun has palatalized under the influence of either the lost palatal fricative, or the following front vowel, or both. In (2.62de), the final glide of the first word is lost.

(2.62) Cluster simplification in compounds

a. rranchex '*colador*' (for atole) < rrants 'colador' + xex 'bowl' (2;120)
b. rranchur '*colador*' < rrants 'colador' + xur 'pot' (2;120)
c. untsakax 'cow dung' < unts 'secretion' + wakax 'cow' (2;98)
d. nataxu kambaj 'Pueblo Viejo' < nataxuy 'old' + kambaj 'town'
e. taxu xa-tyety 'my grandfather' < taxuy 'old' + xa-tyety 'my father'

Casual observation indicates that there are other types of reductions that occur as general fast-speech effects when consonants meet at word boundaries; these are a topic for future investigation.

2.3.3 Vowel reduction

As mentioned in §2.1.5, Huave stresses the final syllable of all native words, root and suffix syllables alike. In unstressed, i.e. nonfinal syllables, there is a process of vowel reduction that erodes the distinction between high and mid vowels. The front vowels *i* and *e* are collapsed and either one can be pronounced as either [i] or [e] or anything in between. Likewise, *u* and *o* are collapsed and either one can be pronounced anywhere between high and mid. Generally speaking, reduced back vowels tend to be high such that *u* and *o* both become *u*-like, but there is variation both with and across speakers (and perhaps linguistically conditioned variation as well). Vowel reduction is most striking in alternations when a contrastive high or mid vowel in a root is pronounced with its underlying quality in final position, but is reduced upon suffixation when it is pushed into a nonfinal position.

(2.63) Vowel reduction

a.	m-**e**-yak-an ➜ m**i**yakan SB-2-put-PL '(that) you (pl.) put it' (2;52)	e.	i-x**o**t-e ➜ ix**u**te 2-hide-RFL 'you (sg.) hide yourself' (2;1)
b.	l**e**jk-ia-w ➜ l**i**jkiaw open-V-ITR 'it opens' (2;145)	f.	ng**o** ñe ➜ ng**u** ñe not ÑE 'have not (VERB-ed)' (2;153)
c.	t-a-joñd-**i**s-an ➜ tajoñd**e**san CP-TV-wipe-1-PL 'we (excl.) wiped it' (2;100)	g.	ti-u-ñ**o**k-af ➜ tyuñ**u**kaf LOC-POS1-neck-3PL 'their necks' (2;7)
d.	m-a-mb**i**l-ach ➜ mamb**e**lach SB-TV-roll-CAUS 'it rolls it' (3;17)	h.	i-m-**u**-pants ➜ im**o**pants FT-SB-TV-fry 'she will fry it' (2;43)

The underlying vowel in suffixing verb roots which never occur word-finally can be diagnosed through the quality of epenthetic vowels. For example, although the root *wejk-* 'be born' never occurs as a final syllable, the fact that its post-root vowel breaks to *ia* instead of *io* means that the post-root vowel is underlyingly /e/, which the vowel harmony rules could only have produced from an underlying /e/ in the root. On the other hand, I have not found any means of determining the "true" vowel of prefixes like the possessive *u-* and *mi-*, which always occur in non-final syllables, since they do not induce any phonological effects on nearby segments.

There are some problems regarding vowel reduction that are deserving of further study. One question is whether reduced vowel tokens cluster into “high” and “mid” groups, meaning that speakers choose one of two distinct but equally acceptable options, or whether measurement of many tokens would yield a random selection of values along an F1 continuum. More issues include to what extent, if at all, the underlying status of the vowel as mid or high affects the height at which it is realized in unstressed syllables; whether there is any influence from vowel quality in adjacent syllables; whether metrical factors come into play at all; and whether there are morphological influences in vowel reduction.

2.4 Phonology of glides

2.4.1 Glide-vowel alternations

The examples in (2.64) show alternations between word-final *w* and vocalizations thereof to *u* or *o*, which take place upon the addition of consonantal suffixes. When single-consonant suffixes are added, the glide vocalizes to host a new syllable with the suffix in the coda. Only plain labial glides vocalize; the palatalized labial glide w^{pal} does not. When a root ends in w^{pal}, a vowel is epenthesized upon suffixation, presumably to facilitate the realization of palatalization. Compare (2.64f), from /t-a-w-s/, to *t-a-w-ius* ‘I borrowed it’ from /t-a-w^{pal}-Vs/ (2;17).

(2.64) *w*-vocalization

a.	n-a-jaw 1SB-TV-see ‘(that) I see it’ (2;1)	b.	n-a-jau-n 1SB-TV-see-PL ‘(that) we (excl.) see it’ (3;32)

c.	miaw an all just 'everything/everyone' (2;62)	d.	miau-s an all-INC just 'all of us (incl.)' (3;32)
e.	t-a-w CP-TV-exit 's/he went out' (1;170)	f.	t-a-u-s CP-TV-exit-1 'I went out' (1;170)
g.	la=pajk-a-w PF=face.up-V-ITR 's/he now lies face up' (2;94)	h.	la=pajk-a-u-j PF=face.up-V-ITR-3PL 'they now lie face up' (2;94)
i.	la=mojk-o-Ø /la=mojk-o-w/ PF=face.down-V-ITR 's/he lies face down' (2;94)	j.	mojk-o-o-s face.down-V-ITR-1 'I lie face down' (2;12)

It is not completely clear whether there is a similar alternation between the palatal glide *y* and the front vowel *i*. When a consonantal suffix is added to a *y*-final root, the vowel of the suffix syllable is front, and if the suffix is a plain consonant, the vowel breaks to *io* or *iu* exactly as a vocalization of underlying *y* to intermediate-stage, pre-breaking *i* would.[3] However, in my notes I have consistently transcribed glide-vowel sequences in unbroken forms like (2.65cd). The key will be to compare (2.65cd) phonetically to known instances of *a-i* hiatus such as the one listed in (2.55).

(2.65) *y*-vocalization?

a. Tim dy-a-ja(y)-ior
ayer PROG-TV-walk-INC
'We were walking yesterday.' (2;93)

b. sa-pu(y)-ion
1POS2-nuera-PL
'our daughters-in-law' (3;25)

c. n-a-ja(y)-ich
1SB-TV-walk-CAUS
'(that) I drive (it)' (3;44)

d. t-a-ja(y)-is-an
CP-TV-walk-1-PL
'We (excl.) walked' (2;93)

[3] The orthographic final glide in the root is redundant for the pronunciation; it is included for morpheme-breakdown transparency.

One situation in which a root-final glide does not vocalize upon suffixation is with suffixing roots like *uy-* 'spin' and *mbay-* 'fear'. Suffixing roots require a post-root vowel, and apparently vocalization of a root segment does not qualify. Instead, a vowel is added, and its quality is determined according to vowel harmony.

2.4.2 Phonotactic restrictions on palatal glides

In (C)V(C) roots, glides cannot occur in either initial or final position next to a homorganic vowel. For palatal glide, this take the form of the morpheme structure constraints in (2.66). All roots with *y* either initially or finally contain back vowels.

(2.66) Cooccurrence restrictions: palatal glides

a. *iy#, *ey#

b. *yi, *ye

Palatal glides occur after front vowels, albeit in the onset of a following syllable, when they are epenthesized to resolve hiatus in certain morphological contexts. Because the Layer 3 first-person suffix *-s* and the Layer 4 plural suffixes *-n* (default), *-f* (3rd person), and *-r*/*-(j)ts* require their own syllable (§6.1.5), they epenthesize a vowel, as shown in the *-VC* shapes of these suffixes in (2.67). A palatal glide then surfaces between the base-final *-e* or *-i* and the vowel *a* of the suffix, although it is not yet known whether there are robust phonetic differences between the sequence transcribed as *iya* in (2.67f) and the *i-a* hiatus in (2.55). However, the epenthetic glide in (2.67bd) is quite salient, and its existence is the reason why I incorporate syllable structure into the cooccurrence restrictions in (2.66).

(2.67) Glide epenthesis upon suffixation

a.	al=m-a-me DUR SB-TV-sleep 's/he is sleeping' (2;65)	b.	al=m-a-mey-af DUR SB-TV-sleep-3PL 'they are sleeping' (2;65)
c.	ndil-i-w-e turn-V-ITR-RF 's/he turns around' (2;1)	d.	ndil-i-w-ey-as turn-V-ITR-RF-1 'I turn around' (2;1)
e.	t-a-mbi CP-TV-kill 's/he killed' (3;53)	f.	t-a-mbi(y)-af CP-TV-kill-3PL 'they killed' (3;53)

The cooccurrence restrictions in (2.66b) are not just static morpheme structure constraints, but also create alternations. When the reflexive suffix *-e* is added to a *y*-final root, the root-final glide is deleted. I assume that this deletion is a repair for the ill-formedness of a palatal glide resyllabified into the onset of a front-vowel syllable.

(2.68) Glide deletion upon front-vowel suffixation

a.	dyu-m-a-joy.joy PROG-SB-TV-sway.RED 'it is swaying it' (2;65)	b.	ndy-a-joy.jo-e PROG-TV-sway.RED-RF 'he's stumbling and staggering' (2;75)
c.	a-ngoy.ngoy TV-creak.RED 'it creaks (trees in the wind)' (2;106)	d.	a-ngoy.ngo-e TV-creak.RED-RF 'it creaks' (same meaning) (2;106)

On the other hand, there are potential counterexamples. In the word in (2.69a), where the reflexive suffix *-e* is suffixed to a root ending in a palatal glide, it is not clear to what extent the glide is retained. The difference may have to do with vowel quality, as the examples in (2.68) have *o* and (2.69a) has *a*, but more data need to be collected and analyzed acoustically in comparison with the *a-e* hiatus context in (2.55). The other possible counterexample is (2.69b), which is morphologically parallel to (2.65d) but has an [e]-like vowel in the syllable following the root-final palatal glide. This vowel could either be a reduction (§2.3.3) of the vocalized root-final glide, in which case the strength of the glide could be studied and compared with (2.69a). Alternatively, this could be a bona fide rising diphthong arising from optional non-final vowel breaking, with an [e]-like quality due to phonetic variation in rising diphthongs. Again, more data need to be collected to see if the [e] quality is phonetically consistent, and whether it is truly front or somewhat centralized, the latter option indicating diphthongization.

(2.69) Apparent *ye* sequences

a. s-a-ja(y)-e
1-TV-walk-RF
'I walk' (using a cane) (2;132)

b. *tajkayesan*
t-a-j.ka(y)-is-an OR t-a-j.kay-ies-an?
CP-TV-angry-1-PL CP-TV-angry-1-PL
'we (excl.) got angry' (2;99)

The fact that *y* is only found before back vowels means that it patterns with the plain coronals in this regard. The initial *y* in the words in (2.70) cannot be attributed to diphthongization of a vowel-initial root, since front-vowel diphthongization would not happen in the environment of a final palatal in (2.70a), and since it would produce *iu* rather than *io* in the voiceless-fricative environment of (2.70b).

(2.70) *y* before back vowels

a.	yaty	'anona (fruit)'	/yat^{pal}/	
b.	yos	'scabies'	/yos/	(cf. /is/ *ius* 'flea')

2.4.3 Phonotactic restrictions on labial glides

The phonotactic restrictions on labial glides are parallel to those on palatal glides, with similarly ensuing sets of issues. A syllable containing a round vowel *o* or *u* never has the glide *w* in its onset, nor in its coda. More generally stated, there is a prohibition against adjacent tautosyllabic [+round] segments. Tautosyllabic but nonadjacent [+round] segments can cooccur, as in the word *wiaf*, from underlying /wejw/ by vowel breaking (§2.2.3) and fusion (§2.1.4).

The ban $*wV_{[+rd]}$ is a static morpheme structure constraint, whereas $*V_{[+rd]}w$ (aside from being a morpheme structure constraint) creates alternations because it is possible for the banned sequence to arise through morpheme concatenation. The repair for illegal *uw* or *ow* sequences, when they arise, is to retain the vowel and delete the glide. In other words, the second instance of [+round] is deleted. Such alternations are seen with the intransitive [+round] suffix, and the third-person plural suffix *-f*.

(2.71) Cooccurrence restrictions: labial glides
$*[X_{[+rd]}X_{[+rd]}]_\sigma$ where X is either a consonant or a vowel
"No adjacent tautosyllabic [+round] segments" ($*wV_{[+rd]}$, $*V_{[+rd]}w$)

In (2.72a-c) the intransitive [+round] suffix surfaces as *w* with roots whose suffix vowel is non-round. However, with roots whose suffix vowel is round, no *w* surfaces (2.72d-f). I analyze this as a labial dissimilation effect. One question for further investigation is whether there are any durational or other effects of the non-surfacing segment, e.g. compensatory lengthening of the final vowels in (2.72d-f).

(2.72) Repair: Labial dissimilatory deletion

a.	la=pajk-a-w PF=face.up-V-ITR 's/he is now lying face up' (2;94)	d.	la=lomb-o-Ø PF=stand-V-ITR 's/he is now standing' (2;94)
b.	la=wejk-ia-w /wejk^{pal}-e-w/ PF=be.born-V-ITR 's/he has now been born' (1;163)	e.	la=mojk-o-Ø PF=face.down-V-ITR 's/he is now lying face down' (2;94)

c.	la=wit-io-w //wit^{pal}-i-w/
	PF=rise-V-ITR
	's/he has now gotten up' (1;162)
		f.	la=chut-u-Ø
			PF=sit-V-ITR
			's/he is now sitting' (2;94)

We can probably dispense with a potential alternative analysis of (2.72d-f), which would be that the final vowels in those forms are themselves the realizations of the intransitive [+round]. As touched on above with the examples in (2.64ij), there are alternations between verb forms like these that lack [+round], and verb forms with additional suffixes where both the suffix vowel and [+round] are realized. These latter forms show that labial dissimilation only applies syllable-internally; consecutive [+round] segments are permitted because the further suffixation enables the second of them to be assigned to the next syllable. (This argument does not work under a morphological analysis where suffixal realizations of the first-person affix are -Vs, with an inherent vowel; however, I do not consider it part of the underlying morpheme, and derive it through epenthesis.)

(2.73) Vocalization of intransitive [+round]

a. la=chut-u-u-s
PF=sit-V-ITR-1
'I am now sitting' (2;5)

b. lomb-o-o-s
stand-V-ITR-1
'I am standing' (2;12)

A slightly more complicated case of labial dissimilatory deletion happens with the third-person plural suffix *-f*. Since *f* is a fused segment, derived from vowel aspiration *j* + the labial glide *w* (§2.1.4), its labial element is subject to deletion immediately following a round vowel. Unlike in (2.72) where dissimilation deletes the entire segment, with the third-person plural *-f* it deletes only the labial element, leaving the aspiration element *j* behind. We thus see alternations between *-f* when vowel harmony gives a non-round epenthetic vowel (2.74a-c), and *-j* when vowel harmony gives a round epenthetic vowel (2.74de) or when the intransitive [+round] suffix surfaces immediately before it (2.74f).

(2.74) Labial dissimilation of 3rd person plural *-f*

a.	a-rang-af TV-make-3PL 'they do/make (it)' (2;65)	d.	a-nol-oj TV-have.issue-3PL 'they have an issue' (1;99)
b.	a-keñ-iaf /a-ken^{pal}-ejw/ TV-carry-3PL 'they carry (it) (on hips)' (3;46)	e.	a-xum-uj TV-find-3PL 'they find (it)' (2;65)
c.	a-j.chik-iuf /a-j.chik^{pal}-ijw/ TV-jump-3PL 'they jump' (2;65)	f.	al pajk-a-m-u-j DUR face.up-V-SB-ITR-3PL 'they are lying face up' (2;92)

Note that the example in (2.74c) displays opacity: labial dissimilation is enforced over vowel quality pre-breaking. Although the broken vowel is phonetically round, it does not behave as phonologically round in their failure to trigger dissimilatory deletion of labial glides, as was also illustrated above in (2.46).

Finally, there is optional deletion of word-final *w* after a falling diphthong. When a word ending in -w^{pal} diphthongizes its nucleus to cue the palatalized status of its final consonant, the phonetic result is a triphthong *Viu*, with its head on the initial vowel. Such words often surface simply with a final falling diphthong *Vi*, deleting the final labial phase. It is interesting to compare this situation, where the root-final consonant is deleted and the secondary articulation kept, to the palatal-rhotic situation in (2.37), where the root-final consonant is kept while the secondary articulation fails to surface. (Because diphthongization never happens before *y*, there is no parallel case with the palatal glide.)

(2.75) Optional deletion of word-final w^{pal}

a. /l^{pal}aw^{pal}/ lyai(w) [-ai(u)]
'key', from Sp. *llave* (3;88)

b. /s-a-w^{pal}/ s-a-i(w) [-ai(u)]
'I borrow (it)' (2;17)

2.5 Laryngeal phonology

2.5.1 Laryngeal dissimilation

Laryngeal dissimilation is left-to-right and deletes the second of two [+spread glottis] features within a one-syllable window. The domain of this process defies elegant formulation, but essentially goes from the nucleus of one syllable to the coda of the next. Dissimilation is triggered by voiceless fricatives {*j s x*} and targets *j*, which disappears completely with no apparent compensatory lengthening. The fact that the sibilant fricatives *s* and *x* also trigger deletion, meaning that they form a natural class with the glottal fricative *j*, is in line with Vaux's (1998) claim that [+s.g.] is the unmarked value of the [spread glottis] feature for voiceless fricatives.

The examples in (2.76) illustrate one of the morphophonological alternations created by laryngeal dissimilation. When a theme vowel becomes aspirated via the passivization process described in , any *j* in the following root syllable is lost.

(2.76) Laryngeal dissimilation

a.	a-naijp TV-sell 'S/he sells it' (3;70)	b.	a-j.nap TV-be.sold 'It is sold' (3;42)
c.	a-paj TV-call 'S/he calls, yells' (2;77)	d.	t-a-j.pa CP-TV-be.called 'S/he was called' (2;24)

The prohibition against two [+s.g.] features within the one-syllable window is also a morpheme structure constraint. San Francisco words containing one instance of *j* can be compared with cognates from the San Mateo dialect which contain two instances of *j*. The examples in (2.77) suggest that either the San Mateo forms are older and San Francisco underwent laryngeal dissimilation as a sound change, or that the San Francisco forms are older and the San Mateo forms reflect analogical restoration.

(2.77) Laryngeal dissimilation: dialectological perspective

a. najta 'woman' (SFco.)   b. najtaj 'woman' (SMo.)
c. ajtsa 'masa' (SFco.)   d. ajtsaj 'masa' (SMo.)

It should be noted that although San Mateo does not have laryngeal dissimilation, it does share with San Francisco a morpheme structure constraint against two tautosyllabic glottal fricatives, whether vocalic or consonantal: the restriction $*[jVj(C)]_\sigma$ (Noyer 2003). As Noyer notes for San Mateo, and as is also the case in San Francisco, the sole exception is the onomatopoeic root *-joj* 'cough'.

The analysis of *f* as the fused realization of aspiration + *w* predicts that if aspiration is deleted via dissimilation from *f*, it should simply turn into *w*. That this indeed is the case is easy to demonstrate with a large number of examples, since the third-person plural ending is *-Vf*, which undergoes dissimilation when it is suffixed to any verb root with an aspirated vowel or coda sibilant.

(2.78) Laryngeal dissimilation in 3rd-person plural *-f*

a.	t-a-kaj-aw CP-TV-look.for-3PL 'they looked for (it)' (3;41)	b.	t-a-kojñ-iow CP-TV-fold-3PL 'they folded (it)' (3;46)
c.	a-j.ch-iow TV-give-3PL 'they give' (1;174)	d.	mi-kius-aw POS-dog-3PL 'their dogs' (1;173)
e.	t-a-xijp-iow CP-TV-bathe-3PL 'they bathed' (3;41)	f.	dyu-m-a-lox-iow PROG-SB-TV-throw-3PL 'they are throwing (it)' (3;42)
g.	u-lajk-aw POS1-ear-3PL 'their ears' (1;173)	h.	u-wix-iow POS1-hand-3PL 'their hands' (1;173)

The sibilant fricatives *s* and *x* can only trigger dissimilation; they are never targets. Even when there is an aspiration in the preceding syllable, creating the environment for dissimilation, there is no change. Although the morpheme structure constraint against sequences of aspiration + sibilant fricative (§2.2.5) follows the pattern of general dispreference in Huave for instances of [+s.g.] that are too close together, not all instances of [+s.g.] behave exactly alike.

(2.79) a. t-a-j.tyux
CP-TV-rot
'it rotted' (2;32)

b. t-a-najp-ius
CP-TV-sell-1
'I sold it' (3;44)

c. piaj-u-s
lie-ITR-1
'I lie down' (1;165)

d. ty-u-paj-as
CP-TV-yell-1
'I yelled' (2;116)

In addition, there appear to be morphological restrictions on the sibilant fricatives' ability to trigger dissimilation. A possible generalization is that *s* and *x* can only delete [+s.g.] in affixes, not roots.[4] This is supported by two considerations. First, there is no morpheme structure constraint prohibiting sibilants from preceding aspirated vowels within a root in the same way that *j* cannot be the onset of a syllable with *j* in the rime. A root can also both begin and end with sibilants (2.80de).

(2.80) a. sojts 'beard'
b. sajk 'medicine'
c. xijk 'cigarette'
d. xix 'sandfly'
e. xex 'bowl'

Second, the first-person affix *s/x* does not trigger [+s.g.] deletion in the verb root in (2.81a), where the root is a single consonant and the affixed word is a single syllable.

[4] Morphology cannot explain the left-to-right directionality observed in the other examples, though. The sibilants can trigger laryngeal deletion in a following suffix when they themselves are suffixes; see (2.85c). In (2.76), the triggering laryngeal is arguably affixal, while the deleted laryngeal is in the root.

Similarly, it does not trigger deletion of the intransitive aspiration in (2.81b). The first-person affix also attaches freely to roots beginning with a voiceless fricative (2.81cd).

(2.81) a. s-a-jch
1-TV-give
'I give it' (1;174)

b. s-a-j.mba
1-TV-break
'I break (it)' (4;16)

c. xa-jiu
1POS-breast
'my breast' (2;7)

d. s-a-sap
1-TV-catch
'I catch (it)' (1;171)

In larger domains, such as the onset of one syllable to the rime of the following syllable, or any other [+s.g.] segments that are two or more syllables apart, there is no dissimilation.

(2.82) a. t-a-jimb-iuf
CP-TV-sweep-3PL
'they sweep (it)' (3;45)

b. t-a-j.mba-af
TV-break-3PL
'they broke (it)' (4;16)

c. t-a-j.chik-iuf
CP-TV-jump-3PL
'they jumped' (3;52)

Whether laryngeal dissimilation applies at all in reduplicated forms is unclear. The reduplicated words in (2.83) are attested with both aspirations intact, but also with one missing; in (2.83be) it is the first aspiration, contradicting the known directionality of dissimilation, and in (2.83d) it is the second. In (2.83f) we see that there is even an apparent backcopying effect possible. It is worth noting that the four forms in (2.83c-f) were all given by the same speaker. The question is whether these deletions reflect laryngeal dissimilation, or whether they are influenced by other process as well; for example in the case of (2.83b), pre-penultimate aspiration weakening (§2.5.4).

There is some question as to whether the examples in (2.83) are fully or partially reduplicated, and it is possible that laryngeal dissimilation behaves differently in the two contexts, so further research is necessary. The first set of forms displays regular degemination, while reduplication in the second set may involve complications; namely, due to regular deletion of word-final velars after aspirated vowels, the velar-less reduplicant might reflect how the base is pronounced prior to reflexive suffixation.

(2.83) Reduplication and laryngeal dissimilation

a.	i-taj.tajt 2-shake.RED 'you shake [the clothes]' (2;145)	b.	a-ta.tajt-e TV-shake.RED-RF 'it shakes itself' (2;145)
c.	dy-a-toj.tojk-e PROG-TV-cluck-RFL '[the chicken] is clucking' (2;91)	d.	dy-a-toj.tok.-e PROG-TV-cluck-RF '[the chicken] is clucking' (2;77)
e.	dy-a-to.tojk.-e PROG-TV-cluck-RFL '[the chicken] is clucking' (3;43)	f.	dy-a-to.tok-e PROG-TV-cluck-RF '[the chicken] is clucking' (3;43)

Finally, affricates are complete nonparticipants in laryngeal dissimilation, neither triggering nor undergoing any form of it. This behavior is in line with the results of MacEachern (1999:6), who found in a cross-linguistic survey that "in laryngeal cooccurrence restrictions, affricates function like stop consonants."

(2.84) Affricates as non-triggers

a. a-jants-af
TV-wash-3PL
'they wash (it)' (2;65)

b. a-koch-iuf
TV-scratch-3PL
'they scratch (it)' (3;42)

2.5.2 Interaction of laryngeal and labial dissimilation

When the conditions for both laryngeal dissimilation and labial dissimilation are met, both processes apply. This happens with the third-person plural suffix *-f*, which, being underlyingly /-jw/, is made up of an aspiration component, a labial component, and nothing else. When vowel harmony or the intransitive [+round] morpheme inserts a round vowel *u* or *o* into the vowel slot of *-f*, this creates the environment for deletion of the labial (*w*) component. If furthermore there is a [+s.g.] on the syllable preceding *-Vf* (e.g. a root with an aspirated vowel), the aspiration component (*h*) is also deleted, and *f* disappears without a trace. Although the third-person plural is not overtly realized in these forms, it is still recoverable: the round vowel triggering labial dissimilation would not have surfaced if no further suffix had been added, and no other suffix consonant besides *f* would have deleted in this phonological context.

(2.85) Laryngeal and labial dissimilation

a. piaj-u-Ø /pej-u-jw/
lie-SB-ITR-3PL
'they lie down' (1;165)

b. t-a-xojt-oØ /t-a-xojt-ojw/
CP-TV-rest-3PL
'they rested' (3;43)

c. t-a-xum-us-uØ /t-a-s^{pal}um-us-ujw/
CP-TV-find-1-3PL
'I found them' (2;75)

2.5.3 Aspiration deletion

Aspirated vowels never surface before a coda (i.e. word-final) voiced segment. This creates alternations in the paradigms of roots which are underlyingly CVjC$_{[+voi]}$. When no suffixes are added, aspiration fails to surface. When suffixes are added, however,the root-final consonant resyllabifies into the onset of the next syllable, and the underlying aspiration surfaces. This processes is attested before nasals (2.86a-f), laterals (2.86gh), and prenasalized stops (2.86ij). I do not know of any roots with an aspirated vowel and final rhotic, but such configurations arise via concatenation of the second-person intransitive *-r* with aspiration-final suffixing roots, and deletion applies here as well (2.86kl). Aspiration deletion does not apply with glides, which always fuse with a preceding aspirated vowel regardless of syllable structure or phonotactic context.

(2.86) Aspiration deletion alternations

a.	a-koñ TV-fold 'S/he folds it' (2;10)	b.	a-kojñ-iow TV-fold-3PL 'They fold it' (2;10)
c.	x-i-pia-n 1-FT-lie-1SB 'I will lie down' (1;164)	d.	x-i-piaj-n-u-n 1-FT-lie-1SB-ITR-PL 'We (ex.) will lie down' (1;164)
e.	a-mem TV-flap '[chicken] flaps [its wings]' (1;156)	f.	t-a-mejm-ias CP-TV-flap-1 'I fanned him/her' (2;9)
g.	s-a-pily 1-TV-bend.joint.DM 'I bend (my knee)' (2;26)	h.	t-a-pijl-ius CP-TV-bend.joint.DM-1 'I bent (my elbow)' (2;26)
i.	t-e-soñ CP-2-pull.out 'you pulled it out' (3;60)	j.	sojnd-io-w detach-V-ITR 'it came out' (3;60)
k.	m-e-piu-r SB-2-lie.DM-2I '(that) you (sg.) lie down' (1;166)	l.	i-m-e-piuj-r-u-n FT-SB-2-lie.DM-2I-ITR-PL 'you (pl.) will lie down' (1;164)

Aspiration deletion is not cyclic; it applies once, to the entire word. A thought experiment demonstrates that this must be the case: if it were cyclic, aspiration would always delete at the level of the root or stem as in the lefthand examples of (2.86); it would essentially never surface, and its existence as an alternation-creating process would be impossible. Instead, the surface phonotactic environment determines its application. Thus in the righthand examples of (2.86), aspiration can surface upon resyllabification of the root-final consonant with a suffix syllable.

An interesting interaction between aspiration deletion and vowel breaking is that the quality of a broken vowel is sensitive to the presence of aspiration, even when aspiration is not realized on the surface. The relevant vowel quality rule (as described above in (2.10)) is that underlying /i/ breaks to *iu* before [+s.g.], and *io* elsewhere. Based on the surface forms in (2.87), one would expect /i/ to break to *io*, since the [+s.g.] environment does not obtain. However, we get a case of overapplication (counterbleeding) opacity: underlying /i/ breaks to *iu*, due somehow to the underlying aspiration, even though the triggering aspiration has been deleted on the surface.

(2.87) Opacity in diphthong quality

a. x-i-piu-n /s-i-pij-n/
1-FT-lie-1SB
'I will lie down (dim.)'

b. piu-m /pij-m/
lie-SB
'that s/he lies down (dim.)'

There are several possibilities for analysis. Derivationally, we would say that the broken-vowel quality rule applies prior to aspiration deletion. Or, we might invoke a sort of phonetic analogy to (suffixed) forms in the paradigm where the aspiration surfaces and the quality of the broken vowel is transparent.

2.5.4 Optional aspiration-related processes

There is an optional fusion process where sequences of vowel aspiration plus voiceless affricate (*ts* or *ch*) fuse and become fricative *s* and *x*, respectively. This happens only morpheme-finally. This process may have implications for the understanding of affricates. There is an intuition that the production of [+s.g.] aspiration, interrupted for a brief stop phrase and resumed for the second half of the affricate, is a diachronically unstable sequence.

(2.88) Optional morpheme-final deaffrication

a. jts → s
b. jch → x

Impressionistically, the process in (2.88b) seems to be the more common one; this could be followed up be a quantitative investigation. Fusion also does not seem to happen with the same frequency in all lexical items. For example I have many tokens of the root *-kojch* 'cut', all non-fused, while it is common for *-wajch* 'hit' to surface as *-wax*; the phonological (vocalic) environment could be a factor, but this is not known.

(2.89) Optional deaffrication: examples

a. a-pak u-mias (cf. a-pak u-miajts, 1;131)
TV-liven POS1-heart
'He becomes happy' (1;100)

b. ungius (cf. ungiujts, 1;127)
'night' (1;98)

c. m-a-ndiak-as (cf. first-inclusive *-Vjts*)
SB-TV-speak-INC
'Let's (incl.) speak' (1;42)

d. i-ux tyukay (cf. i-ujch tyukay)
2-move.over little
'Move over a little.' (4;21)

e. t-a-ndax (cf. t-a-ndajch-iow, 3;42)
CP-TV-chew-3PL
's/he chewed (it)' (3;42)

f. m-a-pex-iaw a-kior (cf. m-a-pejch-iaw a-kior, 3;106)
SB-TV-?-3PL TV-run
'(that) they ran him out of town' (3;106)

Another apparently optional alternation involving vowel aspiration is that it is deleted (or possibly only weakened) in certain metrical and segmental contexts. The metrical context favoring deletion is occurrence in the antepenultimate syllable (and to an impressionistically lesser extent, pre-antepenultimate syllables as well). The segmental context most strongly favoring deletion is a sonorant or other voiced consonant following the aspiration. Aspiration preceding the voiceless velar stop *k* almost always seems to be preserved, for example. Lexical factors also come into play, as the deleted aspiration is most often the intransitive floating *j* (§6.4.1). I do not know whether or to what extent root-vowel aspiration can weaken or delete. Putting all three factors together, the most common context for aspiration weakening is intransitive *j* in the antepenultimate syllable preceding a sonorant-initial root. Some examples are given in (2.90), proceeding roughly from most to least canonical contexts, with the would-be location of aspiration indicated by "Ø" in brackets. The comparison examples in parentheses all have the same page citation as the main examples, indicating variation produced by the same speaker at the same time.

(2.90) Optional weakening/deletion of aspiration

a. t-a-[Ø.]mul-ius (cf. *tajmuly*, *tajmulisan*, *ta[Ø]muliusan*)
CP-TV-enter-1
'I entered' (4;14)

b. t-a-[Ø.]ngot-os (cf. *tajngot*, *tajngotoson*)
CP-TV-come-1
'I came' (4;15)

c. t-a-[Ø.]chik-iuf (cf. *tajchik*, *tachijkior*, *tachikisan*)
CP-TV-jump-3PL
'they jumped' (3;46)

d. t-a-[Ø.]ndach-is-an (cf. *tajndach*, *tandachius*)
CP-TV-fall-1-PL
'we fell' (4;15)

e. t-a-[Ø.]tiorr-is-an (cf. *tajtiorr*, *tejtiorran*, *tajtiorrisan*)
CP-TV-vomit-1-PL
'we (excl.) vomited' (3;46)

Phonetic investigation should reveal whether the aspiration is truly absent in cases of weakening, or whether there is a small amount of aspiration. Potential compensatory lengthening effects on the preceding vowel would also be worthwhile to examine. In addition, a larger amount of data needs to be collected to determine the frequency of aspiration weakening according to metrical and segmental context. It is interesting to note that aspiration weakening is one way of dealing with a context unfavorable to aspiration; relocation of the floating intransitive *j* to a different syllable is another, as described in §6.4.1. Although there is too little data to know for sure what causes one strategy to be picked over another, most of the examples of aspiration mobility in §6.4.1 show relocation to a position preceding a voiceless stop, i.e. a favorable segmental context.

2.6 Loanword phonology

Spanish loans are a significant presence in the Huave lexicon. In many cases, strata of older versus newer loans can be distinguished on the basis of phonological adaptation patterns. It is virtually certain that there are loanwords from languages other than Spanish, perhaps many that have already been obvious to the arealist or specialist in Oto-Manguean or Mixe-Zoquean; the identification and analysis of non-Spanish loanwords is an important area for future research. In the meantime, the following discussion focuses on phonological adaptations of loanwords from Spanish. Many of the same processes are attested in the loanword phonology of the San Mateo del Mar dialect (Davidson & Noyer 1997).

Apocope. Final vowel deletion is probably the most consistent and hence most salient difference between Spanish words and their loaned counterparts in Huave, due to the preponderance of vowel-final words in Spanish. Spanish final vowels are deleted in all older loans, and productively though variably in newer and "online" loans. Speakers have said that deleting the final vowel is what makes a word Huave as opposed to Spanish. Most examples in the rest of this section have apocope.

It is necessary to distinguish two sources of apocope. Because of the sound change in the history of Huave whereby all final vowels were dropped - the change that created the palatalization contrast on morpheme-final consonants - it is likely that loans predating the sound change were borrowed with their final vowels, which were then lost when all final vowels were deleted. On the other hand, Spanish loanwords that entered the language after apocope as a sound change ceased to be in effect would have been apocopated on the basis of phonotactic analogy to other words in the language.

In (2.91a), the loss of a Proto-Huave final back vowel resulted in a plain final consonant which triggers breaking of the preceding underlying /i/. (The final prenasalized stop instead of nasal is probably a hypercorrection based on other nasal-final forms that come about from regular word-final stop-phase deletion.) Conversely, the loss of the final front vowel in (2.91b) resulted in a palatalized final consonant, whose palatalization is realized a palatal offglide on the preceding vowel nucleus.

There is evidence that final vowels may even have been added to consonant-final Spanish loans at an earlier stage of the language, perhaps to fit with a word template of vowel-finality and penultimate stress. Specifically, there are words such as (2.91c) which have a final palatalized consonant, which would seem to indicate that the

Proto-Huave word ended in a front vowel. However, the source words are consonant-final in Spanish, so Spanish cannot be the source of the palatalization. Assuming that it is a loan of sufficient antiquity, the logical source would be a front vowel that was appended to the word upon its adoption into Huave.

(2.91) Evidence for apocope: reflexes of final vowels in loanwords

a. kosiond 'kitchen' < PHu. *kosina < cocina
b. lyaiw 'key' < PHu. *lyawe < llave
c. meloñ 'melon' < PHu. *meloni < Sp. melón

A couple of examples of newer, non-apocopated loans are shown in (2.92). The lack of apocope is not the only evidence for their recent importation; the very oldest speakers use the native word *pujtang* instead of (2.92a), for example.

(2.92) a. gela 'guela lizard' < guela
b. traste 'dish' < traste

Syllable deletion. In some loanwords, entire final syllables are deleted. In at least the first two cases below, this happens in words where Spanish stress is antepenultimate, leaving more than one posttonic syllable in the word.

(2.93) a. ik 'liver' < hígado
b. fis 'sense, justice' < juicio
c. xap 'soap' < jabón

Palatalization. Palatalization takes place in the environment of tautosyllabic front vowels. In (2.94ab) the original vowel quality has been kept and a neighboring consonant has been palatalized, whereas in (2.94c) a vowel has apparently been fronted next to an original palatal consonant. Exceptions like (2.94d) are presumably more recent loans.

(2.94) a. kamix ‘shirt’ < camisa
b. kex ‘cheese’ < queso
c. chiyujty < chayote
d. fis ‘sense, justice’ < juicio

Cluster resolution. In older loans, initial consonant clusters are repaired by vowel epenthesis. The quality of epenthesized vowels can be investigated once more examples (if more exist) are collected. There is also at least one example (2.95c) where one member of the cluster is deleted. Consonant clusters are generally tolerated in newer loans.

(2.95) a. pulat ‘plate’ < plato
b. puran ‘plaintain’ < plátano
c. takwach ‘raccoon’ < tlacuache

ð > ly. This process is found in older loans but not newer ones. It is possible that Spanish [ð] was actually borrowed as plain [l], and the palatalization observed in (2.96ab) comes from loss of the following front vowels.

(2.96) a. mely ‘half’ < medio
b. kumbaly ‘comadre, compadre’ < compadre
c. moð < modo

Fortition. In some words, intervocalic voiced fricatives became voiceless stops.

(2.97) a. xuti < judío (refers to representations of Jesus during Holy Week)
b. ik ‘liver’ < hígado
c. xap ‘soap’ < jabón

β > w. This process is found in some loans, although it is not a feature of Huave-influenced Spanish as spoken by my consultants and presumably reflects pronunciation habits of an earlier period.

(2.98) a. wakax ‘cow’ < vacas
b. kaway ‘horse’ < caballo
c. lyaiw ‘key’ < llave

j > x. Spanish orthographic *j*, pronounced in newer loans as a glottal fricative [h], was borrowed in older loans as a palatalized sibilant. Although Huave speakers these days produce Spanish *j* as a distinctly soft glottal fricative rather than (for example) a velar fricative, it is possible that the occurrence of sibilants in loans reflects the phonetics of a different variety of Spanish that may have predominated in the region at an earlier time.

(2.99) a. xuti 'Jew' < judío
b. xap 'soap' < jabón
d. xarr 'jar' < jarro

ll > l(y). Spanish orthographic *ll* is borrowed into Huave as a lateral, indicating that it must have been a palatal lateral in the donor variety of Spanish. The degree of palatalization word-finally in words like (2.100ab) is not clear to me; *a priori* one would expect them to be palatalized, given the front-vowel environment and lack of vowel breaking, but for unclear reasons they are consistently transcribed as plain in my fieldnotes. Rather than assume that this is a mistake, I will note the inconsistency here and leave it as an issue worthy of phonetic investigation. If they do turn out to be plain, it is possible that the back quality of the original final vowel plays into the explanation.

(2.100) a. kastil 'Spanish' < castilla
b. kostil 'rib' < costillo
c. lyaiw 'key' < llave

ju > f. Spanish sequences of [hw] are fused into [ɸ] when borrowed into Huave, just as Huave underlying sequences of /hw/ are fused on the surface.

(2.101) a. fis 'sense; justice' < juicio
b. féves 'Thursday' < jueves

Vowel levelling. In some cases, one vowel overrides and changes the quality of a neighboring vowel, which becomes a copy of the trigger vowel. This is attested as an anticipatory (2.102ab) and a perseveratory (2.102cd) phenomenon, and with both stressed and unstressed vowels as triggers; only unstressed vowels are targets. In (2.102a) the change to a front vowel entails palatalization of the preceding consonant, while in (2.102b) it does not; this difference could have to do with the age of the loans.

It is not completely clear whether (2.102d) is an example of vowel levelling, or of incorrect final vowel restoration. One feature of Huave-influenced Spanish is variation between final -*a* and final -*o*. Further study of this variation could reveal its causes and conditioning factors: it could be that speakers originally know only the apocopated Huave version of the word and restore the wrong vowel when using it in Spanish, or it could also be that they have simply acquired native-like masculine and feminine categories to individually varying degrees. If there are more examples of this type, it should become clear whether restoration is a phenomenon in non-apocopated loanwords that is independent of vowel levelling.

(2.102) Vowel leveling

a. xindi < sandía
b. Siwisen, Sawisen ‘city of Juchitán’ < San Vicente
c. toðoví < todavía
d. mandaða ‘errand’ < mandado

Lastly, there are a couple of apparently sporadic changes that I have only seen in isolated instances. Further research may reveal more words that have undergone these changes, but in the meantime their conditioning factors can only be speculated upon.

Stress shift. Through apocope and wholesale syllable deletion as described above, Huave has been able both to maintain stress on the original syllable, and maintain its preference for final stress. The exception is the word for ‘cow, cattle’, which has final stress even though the Spanish source word stresses the penultimate syllable.

(2.103) wakax ‘cow’ < vacas

Metathesis. Another sporadic change is the metathesis of the rhotic and interdental fricative in the word for ‘wall.’

(2.104) paðer ‘wall’ < pared

Chapter 3

Diphthongization

3.1 Overview

As we have seen, Huave has two sets of diphthongs: rising, which consist of a palatal glide and back vowel; and falling, which consist of a back vowel and palatal glide. The inventory of surface diphthongs is reproduced in (3.1), in both the orthography being used here, and IPA (in brackets). None of these diphthongs is underlying. In all cases, diphthongization is triggered by coda consonants that conflict in palatality (i.e. front/back status) with the preceding vowel, as will be elaborated on below. Coda consonants are only permitted word-finally, so diphthongs are only found in word-final syllables (aside from cyclicity-related cases discussed in §3.6 and §4.6.2).

(3.1) Huave diphthongs

Rising	Falling
iu [ju]	ui [uj]
io [jo, jʌ, jə, jɨ]	oi [oj]
ia [ja]	ai [aj]

In the descriptive overview in Chapter 2, rules of Vowel Breaking (§2.2.3) were posited to account for the rising diphthongs, while rules of Consonant Fission (§2.2.4) were used to derive the falling diphthongs. In this chapter, I present a deeper phonological analysis to advance the claim that both sets of rules can be subsumed under a single process of Diphthongization. What unites them is the common generalization that they both cue the underlying plain/palatal contrast on final consonants, whose realization in that position is otherwise inhibited due to the lack of release into a following vowel. All diphthongizations result in the second half of the nucleus matching the following coda consonant in whether it is front (palatal) or back (plain): back-vowel-final rising diphthongs before plain consonants, and palatal-glide-final falling diphthongs before palatalized consonants.

The analysis of diphthongization can be separated into two general problems, each of which has complications that receive special emphasis. One problem is why diphthongization happens in the specific contexts where it does. Although it is true that the second half of every diphthong matches the following coda consonant for palatality, this VC "matching" cannot be the driving generalization. This is because there is one case in which a monophthongal vowel does *not* diphthongize before a coda of conflicting palatality: specifically, back vowels {*a o u*} do not diphthongize before palatal coronals {*ty ndy ñ ly x ch nch*}. Any analysis must therefore address why diphthongization does not occur in this context, when it occurs before all other phonologically palatalized consonants.

The second problem, which is more complicated for Breaking than for Fission, is that of how to relate the underlying vowels and coda consonants to the specific vowel qualities of the resulting diphthongs. It is not immediately clear why /i/ should break to *io* or *iu* as opposed to some other kind of diphthong, for example.

In the analysis presented here, the plain/palatal contrast (found on morpheme-final consonants) is represented with [back] and [palatal] features, which are specified as secondary articulations on most consonants, with principled exceptions to be discussed. The process of diphthongization, encompassing both breaking and fission phenomena, consists in the realization of these secondary articulation features on the preceding vowel nucleus. The interaction of [back] or [palatal] with the vowel features produces the observed diphthongal qualities; the solutions to the problem in the preceding paragraph thus rest largely on an accurate understanding of the subsegmental content of the vowels. The proposed vowel features draw on both Particle Phonology (Schane 1984, 1995) and the traditional feature set, following Hayes (1990), in order to enable a coherent analysis of the relationship between underlying and surface segments.

As for the first problem mentioned, the failure of palatal coronals {*ty ndy ñ ly x ch nch*} to trigger diphthongization comes about because [palatal] is specified as a secondary articulation on non-coronals only. On palatal coronals, [palatal] is already the primary place of articulation, and there are no secondary place features. Since diphthongization consists in the realization of secondary consonant features on the preceding vowel nucleus, palatal coronals cannot trigger diphthongization.

The analysis has two points of theoretical interest. First, once the nature of vowel breaking and consonant fission is clarified and the unified analysis developed, Huave adds to the typology of strategies for realization of phonological contrasts (here, palatalization) in perceptually impoverished positions. The linear alternations in where the contrast is realized - before, on, or after the consonant, depending on the phonotactic context - have parallels in phonetics, language change, and other cross-linguistically attested phonological phenomena. Second, it is of interest that plain and palatalized consonants alike trigger diphthongization, since it is unusual for both members of a phonological opposition to be active in the phonology. One interpretation of this is both frontness and backness must be specified; it is not the case that one member of the opposition is marked and active while the other is an inactive, potentially underspecified default. This contradicts various proposals that only one member of a binary phonological opposition can be active and need be specified.

An ancillary and potential point of interest is the feature system proposed for Huave vowels. The main innovation lies in the representation of vowel height with [high] and [low] features that can be combined on a single vowel to derive mid height(s). The theoretical and empirical predictions of this system, including its possibilities for CV interaction, remain to be fleshed out in future work.

The chapter is structured as follows. In §3.2, I describe the underlying and surface forms of all possible word-final VC# combinations, arguing that the observed patterns of diphthongization are driven by the realization of the word-final palatalization contrast, along with various phonotactic constraints. In §3.3, I propose the secondary-feature phonological representations for plain and palatalized consonants, and use them to analyze Fission data; this is followed by §3.4, in which I show how the same analysis accounts for Breaking, given a set of vowel features which I propose and justify. In §3.5 I situate the diphthongization phenomena in diachronic context, complementing the synchronic analysis with historical explanation of the patterns. Lastly, in §3.6 I discuss further problems and issues to be addressed in future research, both on Huave diphthongization in particular, and on the significance of Huave for more general typological and theoretical studies.

3.2 A unified picture of diphthongization

The aim of this section is to lay out the descriptive facts of diphthongization, and build the case that all instances of it are motivated by the requirement for the front versus back status of a final consonant to be realized on the surface.

Both the vowel and consonant inventories can be divided into "front" and "back" halves, as illustrated in (3.2). There are two front vowels and three back vowels, in a familiar five-vowel system. All consonants (except *y* and possibly *j*) come in both palatalized and plain variants, the former of which can be considered "front" and the latter of which can be considered "back." The broad natural classes of "front" and "back," which transcend the consonant/vowel distinction, are motivated by CV interactions throughout the phonology, of which diphthongization is one.

(3.2) Front and back in the Huave inventory

a.	Front vowels	/i e/
b.	Front consonants	/C^{pal}/
c.	Back vowels	/a o u/
d.	Back consonants	/C/

As mentioned at the very beginning of the chapter, identity in frontness or backness between a vowel and following coda (word-final) consonant is the main factor in whether an underlying /VC#/ sequence will surface with diphthongs. I will therefore go through all four logical combinations of front and back Vs and final Cs, illustrating the specific outcome or outcomes in each case.

Front V + Back C. The front vowels *i* and *e* cannot surface as such before phonologically non-palatalized (i.e. plain) coda consonants. Underlying sequences of /iC#/ and /eC#/, with plain codas, undergo what was previously described as Vowel Breaking, to produce the rising diphthongs seen on the left side of the chart in (3.1).

The high front vowel /i/ shows a great deal of phonetic variation in its diphthongized forms. Fairly categorical is the distinction between the high vowel quality in *iu* (3.3), found before voiceless fricatives (including vowel aspiration), and the mid vowel quality in *io* (3.4), found before all other types of consonants. When an underlying front vowel is aspirated, and followed by a plain (back) coda consonant, it will automatically surface as *iu*. The entire voiced part of the vowel nucleus, and hence the entire diphthong, precedes the aspiration.[1] Besides aspiration (*j*), the other voiceless fricatives are sibilants *s* and *x*.

(3.3) Front V + Back C

/iC#/ → iuC# where C is [+s.g.] *j*, *s*, or *x*

a. /wijt/ → w**iu**jt
'sand' (1;149)

b. /t-a-j.lal^{pal}-*i*jw/ → t-a-j.lal-**iu**f
CP-TV-fly-3PL
'They flew' (3;52)

c. /t-a-xijp^{pal}-*i*s/ → t-a-xijp-**iu**s
CP-TV-bathe-1
'I bathed' (1;148)

Among tokens of *io*, which occur before all other types of consonants, there is wide variation in the pronunciation of the mid vowel, which varies in both backness and roundness. It can be a distinctly back and round [o]; back, without much rounding; central, with differing degrees of rounding; or even somewhat fronted and without rounding, in the direction of [e]. The fronted pronunciations are most common in nonfinal-syllable tokens that result from cyclic application of diphthongization; the fact of final stress may have influence here. Some of the other variation between centralized and back tokens is no doubt systematic according to consonantal context, but much of it is speaker-dependent.

[1] Underlyingly aspirated vowels in the diphthongization environment surface as *iu* even where aspiration is deleted on the surface, resulting in overapplication opacity; see §2.5.3 for more detail.

(3.4) Front V + Back C

/iC#/ → ioC# for all C other than voiceless fricatives

a. /t-a-jints/ → t-a-j**io**nts
CP-TV-cry
'S/he cried' (3;46)

b. /a-nchip/ → a-nch**io**p
TV-approach
'S/he approaches' (1;125)

c. /u-lak^{pal}-*i*r/ → u-lak-**io**r
POS1-tooth-INC
'our (incl.) teeth' (1;173)

d. /t-e-xijp^{pal}-*i*n/ → t-e-xijp-**io**n
CP-2-bathe-PL
'You (pl.) bathed' (1;148)

The mid front vowel /e/, when diphthongized, surfaces consistently as *ia* (3.5). The quality of the main part of the nucleus is very similar if not identical to that of monophthongal *a*.

(3.5) Front V + Back C

/eC#/ → iaC# for all C

a. /pets/ → p**ia**ts
'tortilla' (1;2)

b. /t-a-chejch-*e*s/ → t-a-chejch-**ia**s
CP-TV-drop-1
'I dropped it.' (3;23)

c. /al=te-m/ → al=t**ia**-m
DUR=hang-SB
'It's hanging.' (2;110)

d. /pej-t/ → p**ia**j-t
lie-CP
'S/he laid down.' (1;166)

The proposed interpretation of front-vowel diphthongization is that the back-vowel second halves of the diphthongs *iu*, *io* and *ia* express the plain (back) status of the following consonant. Because the final consonant is not released into a vowel, there needs to be some other way to make the critical, contrastive distinction between plain and palatalized consonants, and the diphthongization strategy fills that need. The specific choice of a low or non-low vowel quality for the second half of the vowel depends on the height of the underlying monophthong.

Front V + Front C. Diphthongization of front vowels before plain consonants stands in contrast to the realization of front vowels before palatalized consonants. When a front vowel is followed by a phonologically palatalized coda in underlying representations, the vowel simply surfaces with its underlying quality, *i* or *e*.

The phonologically palatalized final consonants (C^{pal}) fall into two groups with respect to their surface realization, as detailed in §2.2.1. The coronal "palatalizable" consonants have palatal primary place of articulation: {*ty ndy ñ ly x ch nch*}.

(3.6) Front V + Front C: Non-diphthongization (coronals)

a. /nit^{pal}/ ➔ ñity
'palm (tree, leaf)' (1;103)

b. /a-chejch/ ➔ a-chejch
TV-drop
'S/he drops (it)' (3;42)

For the rest of the consonants, comprising all non-coronals plus the rhotics, the surface instantiation of C^{pal} does not involve any palatalization on the consonant, either primary or secondary. The abstract palatalization manifests itself instead in its effects on adjacent vowel nuclei. In this case, the effect of phonological palatalization is to *prevent* diphthongization. Despite the lack of phonetic palatalization on the consonants, we know they are phonologically palatalized due to the monophthongal front vowels *i* and *e* that precede them. Just as the back second halves of rising diphthongs express the plain status of a following coda, the frontness of *i* and *e* on the surface expresses the palatalized status of a final consonant. (Note that r^{pal} and rr^{pal} do not occur after front vowels in any roots collected to date; in §2.2.5 I claim that this is a principled gap.)

(3.7) Front V + Front C: Non-diphthongization (non-coronals)

a. /t-a-j.tip^{pal}/ → t-a-j.tip
CP-TV-rise
'(S)he went up' (3;46)

b. /pek^{pal}/ → pek
'shoulder' (1;172)

c. /a-xeng^{pal}/ → a-xeng
TV-raise
's/he raises (it) (3;38)

In the case of front vowels, notice that plain final consonants, not palatalized ones, are those that trigger a change in the underlying vowel. This is worth pointing out because one would assume that plain consonants are the unmarked member of the plain/palatal opposition, and normally it is the marked member that makes itself felt through phonological activity. For phonetic and historical reasons to be discussed below, this state of affairs makes perfect sense; it is only in terms of cross-linguistic synchronic phonology that it might possibly be seen as aberrant. Nevertheless, this system must be acquired and cognitively mastered by speakers, so its straightforward historical origin does not diminish its significance in this regard. One may also find synchronic motivation in the fact that diphthongization or lack thereof is one of the principal cues for the plainness or palatality of the upcoming consonant, a distinction that bears a high functional load in Huave as evidenced for example by the minimal pairs in §2.2.2. In addition, the pattern is very similar to enhancement of "unmarked" [-nasal] adjacent to [+nasal] segments in e.g. the Gê language Kaingang, as discussed by

Anderson (1976) and Flemming (2004) and elaborated on in §3.6. So, quite far from being an isolated case, it adds to a suite of examples of phonological activity of default feature values as also discussed by e.g. Wetzels & Mascaro (2001). The treatment of examples thus forms an important question for the study of contrast in phonology.

Back V + Back C. When a back vowel is followed by a plain coda consonant in an underlying /VC/ sequence, there is no diphthongization or other change from the underlying representation. Just as the frontness of the monophthongs in (3.6) and (3.7) indicate the palatality of the coda, the backness of the monophthongs in (3.8) indicate the plainness of the coda.

(3.8) Back V + Back C: Non-diphthongization

a. /a-sap/ → a-sap
TV-catch
's/he catches (it) (2;65)

b. /t-a-j.ngot/ → t-a-j.ngot
CP-TV-come
's/he came' (4;15)

c. /a-puk/ → a-puk
TV-hug
's/he hugs (it)' (2;75)

Back V + Front C. We have seen diphthongization in the VC# "mismatch" situation where a front vowel combines with a back (plain) consonant. In the reverse mismatch situation, with a back vowel and front (palatalized) consonant, the vowel nucleus also surfaces as a diphthong to reflect the phonological secondary place features, i.e. palatality, of the coda. A palatal offglide is added to the underlying back vowel, and the result is the falling diphthong series on the right side of the table in (3.1).

Crucially, falling diphthongs are found only before non-coronals. Again, phonologically palatalized non-coronals do not surface with phonetic palatalization; the diphthongal offglide is the only indicator of the consonants' abstract palatalized status. If the vowel is aspirated, the entire diphthong precedes aspiration, like in (3.3a).

(3.9) Consonant fission

/aC^{pal}#/, /oC^{pal}#/, /uC^{pal}#/ → aiC, oiC, uiC for non-coronal C

a. /a-sap^{pal}/ → a-s**ai**p
TV-gift
's/he gives a gift' (3;52)

b. /t-a-long^{pal}/ → t-a-l**oi**ng
CP-TV-hang
's/he hung (it)' (3;45)

c. /puk^{pal}/ → p**ui**k
'feather' (1;83)

(3.10) Falling diphthongs precede aspiration

a. /t-a-najp^{pal}/ → t-a-n**aij**p
CP-TV-sell
'S/he sold (it)' (3;44)

b. /a-ndojk^{pal}/ → a-nd**oij**k
TV-cut
'S/he cuts (it)' (3;42)

c. /chujp^{pal}/ → ch**uij**p
'shark' (1;94)

Falling diphthongs, i.e. those based on underlying back vowels, do not occur before palatal coronals. As noted above, coronals are the only phonologically palatalized consonants that also surface as phonetically palatal. This apparent exception constitutes an important asymmetry between front-vowel and back-vowel diphthongization: back-vowel diphthongization is sensitive to the place of articulation of the coda consonant, while front-vowel diphthongization applies across the board before all plain consonants. While there is a small amount of anticipatory palatal coarticulation before palatal stops, its duration and quality are not nearly as great as in contexts like (3.9); before palatal fricatives and affricates there is even less. Phonetic documentation is of course crucial to this claim and will necessarily follow in a future version of this work. A parallel can be drawn between the "absorption" of adjacent palatal vocalic gestures here in this VC context, and the similar phenomenon in CV contexts (§2.2.1).

(3.11) Back V + Front (Coronal) C

a. /m-a-kal^{pal}/ ➔ m-a-k**a**ly
SB-TV-stay
'(that) s/he stays' (2;24)

b. /t-a-ngoch$^{(pal)}$/ ➔ t-a-ng**o**ch
CP-TV-answer
'(s/he answered' (3;43)

c. /t-a-un^{pal}/ ➔ t-a-**u**ñ
CP-TV-buy
's/he bought it' (3;44)

The generalization underlying both front-vowel and back-vowel diphthongization is that the plain (back) or palatal (front) status of the final consonant must be realized on the surface. In the context of this contrast-realization theory of diphthongization, the failure of diphthongization before palatal coronals is actually unsurprising. Because palatalization is already realized on the consonant itself, in its primary place of articulation, there is no need to realize it on the preceding vowel nucleus as well. Diphthongs are observed only where A) the underlying monophthong does not match the following coda for plainness or palatality, and B) the contrast cannot be realized as the primary place of articulation of the consonant. The latter is the case with palatalized non-coronals, and also with all plain consonants - there is no primary place of articulation on consonants that corresponds to backness in the same way that palatal primary place of articulation corresponds to frontness.

The one genuine exception is that back vowels fail to diphthongize before phonologically palatalized rhotics. In (3.12a) is an example of a root ending in a palatalized tap, but on the surface there is no indication of the rhotic's abstract palatalized status. We only know that it is palatalized due to its vowel-harmonic behavior, shown in (3.12b): a vowel epenthesized upon suffixation is front, rather than back, as would be expected if the root-final consonant were plain.

(3.12) Pre-rhotic non-diphthongization

a. /t-a-j.tsor^{pal}/ → t-a-j.ts**o**r
CP-TV-go.home
's/he went home' (4;15)

b. /t-a-j.tsor^{pal}-*i*s/ → t-a-j.tsor-ius
CP-TV-go.home-1
'I went home' (2;92)

The lack of diphthongization is presumably due to an independent surface dispreference against high vowels before rhotics (see also §2.2.5). As summarized in (3.13), VC# sequences of vowel plus rhotic systematically fail to produce sequences of *ir*] or *er*] on the surface. The three underlying combinations that could potentially give rise to such a sequence (taking diphthongization into account) are (3.13abc). In the (3.13a) case, underlying sequences of front vowel and plain rhotic undergo diphthongization so that there is a back vowel "buffer" before the rhotic, rendering it legal. On the other hand, sequences of the (3.13b) variety would not be eligible for any kind of diphthongization, and would be forced to surface as front vowel plus rhotic; these underlying sequences are systematically absent from the lexicon. Lastly, the (3.13c) situation is the one in (3.12): diphthongization rules would predict creation of a palatal offglide before the abstractly palatalized rhotic, but in this case diphthongization is blocked in order to avoid the ill-formed output.

Cross-linguistic parallels include the failure of *r* to palatalize in Japanese mimetics (Mester & Ito 1989) and more generally in Slavic (Kavitskaya 1997, Kochetov 2005). The reason lies in aerodynamic constraints discussed by Kavitskaya (1997): high vowels, requiring as they do a lesser degree of mouth opening, inhibit buildup of intraoral pressure that is of large enough magnitude to produce a trill.

(3.13) Rhotic-palatal cooccurrence restrictions

	Underlying	Surface	
	Underlying	Surface	
a.	$/V_{front}r/$	-ior, -iar	(Breaking)
b.	$*/V_{front}r^{pal}/$	N/A	
c.	$/V_{back}r^{pal}/$	$-V_{back}r$	(Underapplication of diphthongization)
d.	$/V_{back}r/$	$-V_{back}r$	(No change)

The following chart summarizes the realization of different underlying VC# combinations that have been discussed in this section.

(3.14) Surface realizations of VC# combinations

	Plain C	Coronal C^{pal}	All other C^{pal}
Back V	No change	No change	Consonant Fission
Front V	Vowel Breaking	No change	No change

To summarize in prose, when underlying /VC#/ sequences match for frontness or backness, the vowel surfaces as is; its frontness or backness serves to indicate (or cue) the frontness or backness (respectively) of the coda consonant. When /VC#/ sequences do not match, the nucleus surfaces as a diphthong, and its second half serves to indicate the frontness or backness of the coda. The non-diphthongization of back vowels before palatal coronals and palatalized rhotics is the only exception.

3.3 Secondary features and back-vowel diphthongization

This section deals with the phonological representation of the plain/palatal contrast on consonants, and sketches out an analysis of diphthongization. Given the previous section's claim that diphthongization is driven by the need to realize final consonants' plainness versus palatality on the surface, the representation of the contrast and the analysis of diphthongization are inextricably linked. Here, I propose to represent the plain/palatal consonant contrast with place features [back] and [palatal], which for most consonants are secondary and exist alongside primary place features such as [labial] or [velar]. The analysis of diphthongization involves the transfer of the secondary [back] and [palatal] features from their underlying association with a final consonant to their surface location on the vowel nucleus. The main advantages of this analysis are that it gives a unified account of front- and back-vowel diphthongizations, which otherwise eludes us, while also independently motivating the lack of back-vowel diphthongization before palatal coronals (rather than having to stipulate it).

I start by discussing general philosophical issues around the representation of phonological contrasts and making explicit some assumptions about when to specify or underspecify features. Against this background I present consonantal representations that specify both backness on plain consonants, and frontness on palatalized ones. The diphthongization analysis is then illustrated in terms of these representations; arguments favoring the proposed analysis over alternative analyses are also given. I focus mainly on back-vowel diphthongization, since front-vowel diphthongization introduces complications whose analysis must wait for the discussion of vowel features in §3.3.

The distinction between plain and palatalized consonants is, obviously, a two-way opposition. The best way to represent it is less obvious, however, as there are a number of logically possible strategies for the representation of two-way oppositions. Although a comprehensive survey and discussion of approaches to contrast is beyond the scope of the current work (see Hall 2007), there are two basic options I will consider here: either specify both members of the opposition with different values for the relevant feature, in this case palatality; or assign a feature to only one member and leave the other underspecified. For the plain/palatal contrast on Huave consonants, I will evaluate these options with respect to feature visibility to the diphthongization process. Thus extremely late insertion of default features that are not visible to diphthongization would count as an instantiation of the underspecification strategy.

One reason to adopt underspecification would be parsimony: a desire to avoid redundant or otherwise unnecessary elements in phonological representations. If a feature value can be predicted based on other features that are present (for example, a high back vowel automatically being round, if there is no high back unrounded vowel in the inventory), the segment can still be distinguished uniquely from other segments without specifying the redundant feature underlyingly. This is essentially the Contrastive Underspecification approach (see e.g. Steriade 1987; Mester & Ito 1989; Dresher, Piggott & Rice 1994; Calabrese 1995, Hall 2007). Alternatively, and more relevantly to the present case, one could stipulate from the get-go that for any two-way opposition, only one member will be the specified one (see e.g. Archangeli 1988, Mohanan 1991, Steriade 1995 on Radical Underspecification). Lack of specification for a feature entails membership in the designated unspecified category, which may or may not even form a natural class - and if it does not, this is a further reason not to assign it a feature. With regard to the redundancy criterion, there is never a reason to fully specify both members of a genuinely two-way opposition; specification of binary oppositions is restricted to those cases where there is a three-way contrast between the two polar values plus an underspecified category.

Lack of natural-class behavior is another reason why one would adopt an underspecified representation. Some two-way oppositions are asymmetrical, to the extent that there is only one really clearly defined category, and all other segments not in that category seem characterized more by the absence of the category-defining feature rather than of any opposing feature. In this case, it makes sense to specify a feature only on the clearly defined category. Not only would an opposing specification for other segments be unnecessary, it could also be misleading and wrong, implying that speakers cognitively perceive the "everything else" group as a potentially phonologically active natural class, in cases where they in fact do not (Steriade 1995). Such oppositions tend to be asymmetrical in numbers, meaning that there is a small number of segments in the category, as opposed to the "everything else". It is claimed for these oppositions that only the specified category ever forms a natural class with regard to phonological processes, i.e. only the specified category can be involved in any process sensitive to that category.

The formal link between specification and phonological activity is that presumably, any feature that triggers or is targeted by phonology must be referred to in rules or constraints, and to be referred to, it must exist. For the die-hard feature-specification minimalist, there are ways around this, like formulating rules on the absence of a feature. The real empirical question is whether the process in question is triggered by independent factors and simply happens to be blocked by the opposing feature value, in which case such an approach is justified (if perhaps notationally confusing). However, if there is something about the properties associated with the absence of a feature that is the principal trigger for the process, underspecification cannot really be justified. A putative example would be “unround harmony” in Ineseño, as discussed by Applegate (1971) and Hyman (2002), where unround vowels cause round vowels to become unrounded. If the apparent default category truly does trigger the process (and extensive analysis may be necessary to determine whether this is the case), it may still be possible to cook up a formalism to refer to the absence of a feature, but such an approach sidesteps the empirical issue and renders the predictive power of underspecification theory essentially meaningless. This issue, of whether a default category triggers a process or merely permits an independent process that the specified category happens to block, will come into play below with respect to Huave as we consider multiple possible analyses of diphthongization.

Full specification may be appropriate for oppositions that are more symmetrical, where it is difficult to privilege one category over another based on how many of each are in the language’s inventory, or on a clear division between a category that involves the addition of an articulatory gesture (such as rounding or nasalization) versus a default. In many languages, the contrast between back and front vowels might be considered an example of a more or less symmetrical opposition. Full specification may be the only viable option in cases where both members of the opposition are active in triggering phonological processes. It has been speculated that there are not actually oppositions like this in the world’s languages, with both members active, and that phonological features thought to be binary could turn out to be universally privative (e.g. Steriade 1995). The research program driven by this hypothesis has led, among other things, to the discovery of counterexamples that appear to falsify it, such as those discussed by Wetzels & Mascarò (2001).

I propose here that the Huave plain/palatal contrast offers another example of a dually active opposition, and that both plainness and palatality should be specified on consonants. At first glance, secondary palatalization seems to be a prime candidate for a privative specification: palatalization is something that is present on some segments and absent on others, so it is not immediately clear why a feature should be assigned to its absence. However, the main reason I advance for specifying plainness is the fact that it triggers the front-vowel diphthongization ("breaking") described in §3.2. With front vowels, it is not the case that palatalized consonants occasion some phonological change between the underlying and surface forms to enhance the plain/palatal opposition; instead, it is the plain consonants that do this, and a back-vowel component is introduced into the nucleus. Provided that the diphthongization is caused by the plainness of the consonant, rather than appearing before plain consonants but actually being caused by other factors, the consonants' non-palatal status should therefore be specified with a feature.

Note also that the plain/palatal contrast divides the Huave consonant inventory almost perfectly in half; this symmetry is more characteristic of eqiupollent oppositions than of privative ones. It is not in itself a criterion for deciding between fully specified versus underspecified representations, but one can speculate on a link between symmetry and phonological activity. If the putatively marked category encompasses a full half of the phoneme inventory, the default category can no longer be taken for granted or even correctly assumed at a probability much greater than chance. It is not unthinkable that this fact would lead to “default” category membership being more salient than if it were the majority, normally expected case. Speakers’ potentially greater awareness of the default as a category in opposition to the marked one could make it possible for the former to be active in phonological processes. In other words, speakers might be more likely to form generalizations about, and phonologize phonetic effects associated with, a category that is more cognitively salient to them. At the very least, we know that phonology is sensitive to salient entities, as in for example positional prominence effects (Beckman 1997, Barnes 2002).

The current proposal for representations of Huave consonants in morpheme-final position (the only position where palatality is contrastive) is illustrated in (3.15). The consonants are specified with features for primary place of articulation, such as labial or velar, and secondary place of articulation, which is either [back] (for plain consonants) or [pal] (for palatalized consonants).

(3.15) Plain vs. palatalized consonant representations

	a. /p/	b. /p^{pal}/	c. /t/	d. /t^{pal}/	e. /k/	f. /k^{pal}/
	|	|	|	|	|	|
Primary place	[lab]	[lab]	[cor]	[pal]	[vel]	[vel]
Secondary place	[back]	[pal]	[back]	--	[back]	[pal]

The representations in (3.15ab) show the place features for the non-coronal (“non-palatalizable”) consonants /p/ and /p^{pal}/. While both have [lab] as primary place, the plain consonant has secondary [back] and the palatalized one has secondary [pal]. For the time being, I remain agnostic as to the hierarchical structure of the feature tree, as Huave data remains to be tested against the predictions of various feature-geometry theories such as those in Ní Chiosáin & Padgett (1993), Clements & Hume (1995), and Halle, Vaux & Wolfe (2000).

For the "palatalizable" coronals, the representational nature of the contrast is different. Unlike non-coronals, the pair /t/ and /t^{pal}/ actually differ in their primary place of articulation, which is [dent] for plain coronals but [pal] for palatal ones. While plain /t/ has a secondary [back] feature, palatal /t^{pal}/ does not. The reason for the underspecification is that palatal coronals are unique in not triggering diphthongization; there is thus no evidence for the presence of a phonologically active secondary feature.

The last pair of examples, (3.15ef), shows the proposed representations for plain and palatalized velars, which have [vel] as primary place of articulation, and [back] and [pal] (respectively) as secondary. The representations are parallel to those for labials in (3.xab). Some feature-geometric systems use a feature [dorsal] to encompass both velars and back vowels (e.g. Clements and Hume 1995), but I will not use this approach for Huave, since there is no evidence that velars interact with vowel features beyond those of consonants at any other place of articulation. In particular, secondary [back] must be specified in (3.15e) because otherwise the analysis would incorrectly predict that front vowels do not diphthongize before plain velars.

I now move on to the analysis of diphthongization, which is a formalization of the generalization that diphthongization is driven by the need to realize secondary place features on the surface. The basic conflict is that although the secondary place features need to be realized, there is no strategy in the language for doing this on the consonant itself. Non-coronal consonants never have surface secondary palatalization, which is to say that consonants with secondary [pal] cannot accommodate this feature on the surface. Neither is there a strategy for realizing secondary [back] on the surface, for example through velarization as a secondary consonantal articulation.

It is a somewhat odd situation that even though the features belong to the consonant in the underlying phonology, they are never associated with it on the surface. Instead, the secondary features can be detected through their effects on vowel nuclei adjacent to the consonant. Arguments for assigning these feature specifications to consonants, instead of e.g. having them float in the lexical entries for whole morphemes, are given in §2.2.2. Because in word-final position there is no following epenthetic vowel to realize the secondary features on, they are transferred to the preceding vowel nucleus instead.

In (3.16) I schematize the realization of secondary [pal] on a preceding back-vowel nucleus in the word *oik* 'cloud', underlyingly /ok^{pal}/. The underlying place features are shown in (3.16a). (For the purposes of this illustration I abstract away from the vowel height features, which will be discussed in the next section; and from the hierarchical prosodic structure of the syllable.) The representation in (3.16a) is not surface-viable, as there is no way to realize both the primary [vel] and secondary [pal] place features on the consonant. Secondary [pal] is therefore relegated to the preceding nucleus (3.16b) and appended as an offglide to the already-existing vowel *o* (3.16c).

(3.16) Back-vowel diphthongization

	a.	b.	c.
	/ o k^{pal} # /	o _ k^{pal}	o i k
Primary	[bk] [vel]	[bk] [vel]	[bk][pal][vel]
Secondary	[pal]	[pal]	

On the other hand, palatal coronals do not have the problem of multiple underlying place features whose simultaneous realization is impossible on the surface. Thus no resolution or change between underlying (3.17a) and surface (3.17b) forms is needed. The lack of back-vowel diphthongization before palatal coronals follows from the proposed representation, which does not have the secondary place features that are the source of the surface palatal glides. Palatality on coronals, unlike for other phonologically palatalized consonants, is realized on the consonant itself.

(3.17) No back-vowel diphthongization before coronals

```
         a.  /   a   t^pal #  /        b.      a   ty
                 |   |                         |   |
Primary         [bk][pal]                    [bk] [pal]
```

One of the reasons for analyzing the secondary-feature realization as part of the nucleus (rather than e.g. a pre-articulation on the consonant) is the fact that the entire diphthong comes before vowel aspiration, if the underlying vowel is aspirated (as in (3.10)). I leave a fuller prosodic analysis for future research, noting that the San Mateo del Mar contrast between short and long diphthongs, which correspond to San Francisco del Mar unaspirated and aspirated diphthongs respectively, could make for an interesting comparative study.

Aside from back vowels before palatalized coronals, the other (and the main) context where vowels do not diphthongize in closed syllables is where the frontness or backness of the vowel matches the secondary place feature on the coda consonant. In words like *pek* ‘shoulder’ (from /pek^{pal}/ with front VC) and *up* ‘leaf’ (from /up/ with back VC), there is a sense in which the plain or palatalized status of the final consonant is still realized on the preceding vowel, even though there is no change in the quality of the underlying nucleus. It is precisely the preservation of the front or back monophthong that indicates secondary place on the consonant. This observation can be translated into the analysis by positing a process of Vowel Place Merger, as illustrated in (3.18). The difference between (3.18a) and (3.18b) is essentially the same as that between (3.16a) and (3.16b): the secondary place feature of the consonant links to the nucleus. Whether or not an empty vowel sub-slot is posited here as it is in (3.16b) is not really material to the result, shown in (3.18c), because the next step in the process merges the two [pal] features on the nucleus into a single one.

The merger process is crucial because underlying /-ek^{pal}/ surfaces as *-ek* and not as *-eik*, with a palatal offglide parallel of the sort observed in back-vowel diphthongization. The merger can be seen as an extension of the same OCP-driven morpheme structure constraint against tautosyllabic sequences of vowel and homorganic glide (§2.4).

(3.18) Vowel Place Merger: Front

	a.	b.	c.
	/- e k^{pal} # /	e k	e k
Primary	[pal][vel]	[pal] [vel]	[pal][vel]
Secondary	[pal]	[pal]	

The same type of merger can be posited for [back]. In (3.19b), the secondary [back] feature on the consonant goes into the nucleus, and in the surface form (3.19c) it is merged with the preexisting vocalic [back]. Again, the result is preservation of the monophthong, rather than a offglided form such as **uəp*.

(3.19) Vowel Place Merger: Back

```
          a.  /  u   p   #  /       b.      u       p            c.      u  p
                 |   |                      |   \   |                    |  |
Primary        [bk] [lab]                 [bk]  \ [lab]                 [bk][lab]
Secondary            [bk]                         [bk]
```

Finally, I will foreshadow how the same analysis applies to front-vowel diphthongization. The example word in (3.20) is *iot* ‘earth’, from underlying /it/ with a front vowel and plain consonant (3.20a). In the same way as we have seen thus far, the impossibility of simultaneously realizing [cor] and [back] on the final consonant leads to transfer of [back] onto the preexisting vowel nucleus. Since the two nuclear elements have opposing place features, there is no merger, and a diphthong results (3.20c).

(3.20) Front-vowel diphthongization

```
          a.  /  i   t   #  /       b.      i   _   t            c.      i   o   t
                 |   |                      |       |                    |   |   |
Primary        [pal][dent]                [pal]   [dent]              [pal][bk][dent]
Secondary            [bk]                         [bk]
```

In §3.4 I will propose featural representations for the Huave vowels and complete the discussion of front vowel/plain consonant sequences by analyzing how the surface vowel quality in the diphthong is derived.

3.4 Vowel features and front-vowel diphthongization

The problem left over is why the diphthongized front vowels come out with the vowel qualities that they do: /e/ as *ia*, and /i/ as *io* and *iu* depending on the presence or absence of a following voiceless fricative. It is important to address this problem, because the central claim of the analysis is that diphthongs consist of the features of the underlying vowel, plus either the [back] or [pal] feature from the consonant. With back-vowel diphthongization, it is straightforward that the [pal] feature contributes a palatal glide. But the viability of the analysis hinges on whether or not the front-vowel diphthongizations can plausibly be derived from the addition of [back] to whatever features make up /i/ and /e/. Here, I will propose featural representations for Huave vowels that correctly predict the outcome of front-vowel diphthongization.

We can start by pointing out the shortcomings of traditional features in this regard. As for the diphthongization of /eC/ to [ja]C, the first half has frontness from /e/, and the second half has the backness that presumably comes from secondary [back] on the consonant. One also sees intuitively that the first half is high, and the second half is low, and that this represents a kind of fission of the mid quality of the underlying vowel. However, because traditional representations use binary features [±hi] and [±lo] for vowel height, this fission is difficult to capture. The only way to do it seems to be to specify /e/ for the negative values of both features, as shown in (3.21). Only the nucleus is shown, starting in (3.21a) from the stage corresponding to the one in (3.20b). Default feature fill-in rules appear to be necessary in (3.21b) for the resulting vowels, which are not uniquely determined by the redistribution of the input features. In particular, the feature combination [bk]/[-hi] in the second half of the diphthong is also shared by the mid back vowel *o*. The first half of the diphthong is less of a problem, since the [pal]/[-lo] ambiguity between *i* and *e* can be resolved by stating independently that only *i* can occupy the onglide or offglide position of a nucleus.

(3.21) Diphthongization with traditional features

a.
```
  e    __
  |    |
[pal] [bk]
[-hi]
[-lo]
```

b.
```
  i    a
  |    |
[pal][bk]
[-lo][-hi]
```

On the other hand, Particle Phonology (Schane 1984, 1995) is an approach to vowel feature representations that has been developed in part with evidence from diphthongization processes, so it is especially suited to representing diphthongization. In Particle Phonology, the formal distinction between vowel segments and vowel features is eroded. There are three vowel particles - I, U and A - and different combinations of these particles yield different vowels. The particle compositions of vowels are written in curly brackets. For example, the particle I by itself is simply the vowel [i]. Adding an A to it, however, contributes an element of lowness, so {ia} yields [e]. Similarly, the particle U by itself is simply [u], but adding an A particle puts the height between the high height of U and the low height of A, in other words, mid; the result is [o].

(3.22) Cardinal vowels: Particle Phonology representations

i	e	a	o	u
{i}	{ia}	{a}	{ua}	{u}

The Huave diphthongizations can be conceptualized as fission and distribution of vowel particles between two halves of the nucleus. When {i}, the frontness particle, is pushed into the first half, any remaining particles occupy the second half. In (3.23a), the remaining particle is {a}, which surfaces straightforwardly as the vowel *a*. In (3.23b), the {i} was the only original particle in the vowel, so its attraction toward the left edge leaves a vacuum of particlelessness in the second half of the nucleus. In Schane's (1984) theory, the absence of a particle results in a centralized schwa-like vowel, and the prediction is fulfilled in that this is more or less what we find. The variable *o*-like and *e*-like realizations, along with the pre-[s.g.] *u* realizations, might be accounted for with processes or rules closer to the surface level.

(3.23) Fission in Particle Phonology

a.	e	→	j	a
	{ia}		{i}	{a}
b.	i		j	ə
	{i}		{i}	{Ø}

Although the Particle Phonology analysis gets us this far, there are reasons not to replace features with these particular particles in the analysis of Huave. These have mainly to do with CV interactions and the untenability of representing secondary consonant articulations with particles (cf. van de Weijer 1994). First, if we want a [back] feature on plain final consonants that gets realized on the preceding nucleus, neither A nor U words due to the additional lowness and roundness that they contribute. We really only want backness, independently of the other dimensions. Second, allophonic palatalization of onset coronals before *u*, which is motivated by height (§2.2.1), is difficult to represent when the high height of *u* cannot be separated from its backness and roundess, which are antagonistic to palatalization.

Following Hayes (1990), I observe that a key advantage of Particle Phonology is the scalar representation of height. Addition of A particles incrementally lowers vowel neight; subtraction of A particles raises it. Since vowel height is in the physical world a scalar phenomenon, such representations allow us to model patterns related to the property of scalarity that phonologize into the grammars of languages. In Hayes (1990) and in (3.24), height-feature particles are used instead of traditional A particles. This allows us to capture the scalarity of height, without binding height to other dimensions characterizing the A particle, such as backness.[2]

[2] See also Clements (1991) on the scalar representation of vowel height, and Mortensen (2006) on the general topic of scales in phonology.

(3.24) Proposed feature set for Huave vowels

i	[pal], [hi]
e	[pal], [hi], [lo]
a	[back], [lo]
o	[back], [hi], [lo], [rd]
u	[back], [hi], [rd]

The vowel feature specifications proposed in (3.24) are necessarily subject to the same general philosophical criteria for consonant feature specifications that were laid out in §3.3. Notice for example that if we used only [lo] and got rid of [hi], the five-way vowel contrast could be preserved because there is no pair of vowels that contrasts solely in the presence or absence of [hi]. However, [hi] must be specified according to the criterion of phonological activity, because it is visible to onset palatalization as discussed in §2.2.1. In a similar vein, I specify the roundness feature [rd] even though its specification is not necessary if our only goal is to use the minimal feature set to distinguish the five vowels. Since roundness is visible to labial dissimilatory deletion (§2.4.3), I assume a phonological specification for it is present.

In light of the proposed feature specifications, the revised analysis of diphthongization is presented in (3.25) for the mid front vowel *e* and in (3.26) for the high front vowel *i*. In (3.25b), the underlying sequence in (3.25a) is transferring the final consonant's secondary feature onto the nucleus by the same regular process illustrated in §3.3 for the other diphthongizations. Meanwhile, the requirement for the front element of the diphthong to turn into a glide means that the only height feature compatible with [pal] is [hi]. The feature [lo] is bumped onto the fully vocalic head of the nucleus, giving the result in (3.25c). A similar sequence of events is depicted in (3.26), with the difference that feature fill-in would be required in order to get the actual surface-observed vowel qualities. The relegation of this feature determination to a different level of the phonology seems reasonable in light of the noncontrastive and phonetic variation involved.

(3.25) Diphthongization: *e*

```
a. /  e   k   #   /       b.    e  _  k           c.     i   a   k
      |   |                     |                        |   |
    [pal][vel]                [pal]   [vel]            [pal][bk][vel]
     [hi] [bk]                [hi]                     [hi]  [lo]
     [lo]                     [lo]
```

(3.26) Diphthongization: *i*

```
a. /  i   t   #   /       b.    i  _  t           c.     i   o   t
      |   |                     |     |                  |   |
    [pal][bk]                 [pal]  [bk]             [pal] [bk]
```

3.5 Diphthongization: historical context

Now that the basic analysis of diphthongization has been presented, I will contextualize it within the diachronic picture of how diphthongization arose in Huave, since it is useful to see the relatively straightforward relationships between proposed elements of the synchronic phonology and their diachronic precursors.

The synchronic patterns of diphthongization can be more easily understood in light of their historical origin. To understand the phonological behavior of the plain/palatal contrast on final consonants, of which diphthongization is a reflex, we should start by understanding where it came from. Proto-Huave had final vowels, and contrastive palatalization arose when final vowels were lost across the board (Suárez 1975). The newly final consonants were plain if they had preceded a back vowel, and palatalized if they had preceded a front vowel. The relationship between lost final vowels and the synchronic underlying representations I have proposed is illustrated in (3.27). In essence, the secondary place features [back] and [pal] are the reflexes of what were once full segments - back and front final vowels, respectively. The final vowels were reconstructed by Suárez (1975) on the basis of comparative evidence, and Noyer (p.c.) has pointed out that they were still marginally present in the San Dionisio del Mar texts collected by Radin (1929), which confirms if not the specific qualities of all final vowels, at least the fact of their prior existence.

(3.27) Loss of final vowels (proto-forms from Suárez 1975)

a.	*-jaw**a** 'know, see'	>	-jaw	/-jaw$^{\mathbf{bk}}$/
b.	*po:p**o** '*tenate* basket'	>	pojp	/pojp$^{\mathbf{bk}}$/
c.	*mil**i** 'lisa fish'	>	mily	/mil$^{\mathbf{pal}}$/
d.	*-lè:k**e** 'open'	>	-lyejk	/-lejk$^{\mathbf{pal}}$/

Diphthongization can be understood as the phonologization of vowel-to-vowel coarticulation upon the loss of the final vowels (cf. Blevins & Garrett 1998 on Rotuman and Kwara'ae). When the final vowels still existed, we can expect that there was anticipatory vowel-to-vowel coarticulation between the initial and final vowels of *CVCV roots. In roots where the initial vowel was front and the final vowel was back, this coarticulation presumably took the form of slight backing at the end of the first vowel, which I render in approximate form in (3.28a) as a schwa offglide. In roots with the opposite configuration, of a back initial vowel and final front vowel, the anticipatory coarticulation would have involved slight fronting on the end of the first vowel, which is rendered in (3.28b) as a phonetic-level palatal offglide.

(3.28) Phonologization of V-to-V coarticulation

a.	*titɨ	>	*ti^{ə}tɨ	>	* ti^{ə}t(ɨ)	>	tiət	/tit^{bk}/	'down(ward)'
b.	*-tangi	>	*-ta^{j}ngi	>	*-ta^{j}ng(i)	>	-taing	/-tang^{pal}/	'belly'

It is well known that listeners factor out parts of the phonetic signal that are attributable to expected patterns of coarticulation with nearby segments (e.g. Fowler &

Smith 1986, Ohala & Feder 1994). Thus in the presence of the final vowel, the slight coarticulatory offglides on initial vowels would not have been heard as diphthongizations, but rather factored out and the vowels perceived as monophthongs. The factoring-out is indicated by the superscripting of the offglides in (3.28): they are present in the phonetic signal, but not parsed as phonological units. However, as final vowels weakened (indicated by parenthesization of the final vowels), it became possible to misperceive the coarticulation as an intentional diphthongization. The mechanism of change is similar to the well-known case of Germanic umlaut. Additionally, the presence of stress on the historically penultimate syllable may have entailed increased duration in the vowel nucleus, which in turn could have entailed increased duration of the coarticulatory phase which enhanced the possibility of misperception.

Eventually, when final vowels were lost, the diphthongization came to contrast with monophthongs, as they were no longer conditioned by a following vowel. Instead, in the current analysis, it became one of several phenomena conditioned by the abstract, contrastive secondary [back] or [pal] left behind on the consonant.

Although the final form given in (3.28a) is the approximate phonetic output attested in the other three Huave dialects (Suárez 1975), front-vowel diphthongization underwent further development in San Francisco del Mar. Whereas the front vowel was historically the main vowel and the back/central part developed from an offglide, in San Francisco del Mar there was a switch: the front vowels became glides, and the offglide became the head of the diphthong (as marked with an acute accent). The exact phonetic balance between the two halves of the diphthong in other dialects is not known, but what is clear is that they reflect one or more of the intermediate stages shown in (3.29).

In the San Francisco dialect, the central-vowel part of the diphthong continued to evolve in quality, migrating back in the vowel space.

(3.29) Development of front-vowel diphthongization

*i$^{\text{ə}}$ > *íə > *iə́ > jə > jo

Given the hypothesis of diphthongization as originating from coarticulation, we are now in a better position to understand why there is no diphthongization in the VC# contexts where the vowel and consonant match for [back] or [pal]. Previously in the discussion of vowel place merger, it was pointed out that it would be a logical possibility for there to be diphthongs of some sort in the "matching" VC context as well. But where the consonant has the same value of [back] or [pal] as the preceding vowel, this means that historically, both vowels in the root were either front, or they were both back. In all of Suárez's reconstructions, in fact, if the two root vowels were both front or both back, they were identical.[3] Therefore we can hypothesize that vowel-to-vowel coarticulation did not produce anticipatory phonetic offglides of threshold-meeting magnitude on the initial vowel. In particular, where the two vowels were identical, we expect that there would have been no significant formant changes induced by V-to-V coarticulation at all.

(3.30) No diphthongization

a.	*-le:ke	>	-lyejk	/-lejk^{pal}/	'open'
b.	*-jaw	>	-jaw	/-jaw^{bk}/	'know, see'

The coarticulation hypothesis sheds light on why back vowels fail to diphthongize before palatal coronals. Because coronals still have inherent palatal place of articulation, anticipatory fronting on the preceding vowel is expected. It remained

[3] If this reconstruction is correct, it provides an interesting diachronic parallel and possible source of the "sour grapes" vowel copy pattern that is the topic of Chapter 4.

possible for listeners to factor it out as being due to coarticulation on a monophthong, rather than to an assimilatory diphthongization. The final stage in (3.31) shows that the palatal offglide remained coarticulatory with the palatal consonant, as it is redundant. As mentioned in §2.2.2, phonetic evidence is needed to cement the synchronic demonstration of weak coarticulation in this context in comparison with the full-fledged palatal glide present in the genuine diphthongizations.

(3.31) Predictable coarticulation

*kati	>	$^*ka^jtyi$	>	$^*ka^jty(i)$	>	ka^jty	‘fish’

3.6 Discussion

I will close the chapter by first pointing out some complications and unresolved issues in Huave diphthongization, then outlining some directions for future research in a broader theoretical and typological context.

In (3.5d), as well as in examples from §2.2.3, front-vowel diphthongization is triggered by a suffixal version of the mobile completive affix *t*. The analysis proposed in this chapter would require that *t* to have a secondary [back] feature. However, as illustrated in §2.2.1, prefixal versions of coronal mobile affixes *t* (completive) and *n* (first-person subordinate) are subject to allophonic palatalization before front and high vowels. Their susceptibility to palatalization would imply that they are underspecified; prespecification for [back] would under standard feature-geometric assumptions presumably prevent them from taking on a [pal] feature. This is a paradox that is important to point out, although its proper resolution awaits further research.

The main set of issues I wish to discuss has to do with cases of optional over- and underapplication of diphthongization. The analysis thus far has focused on diphthongs in final, closed syllables. In nonfinal syllables, the normal case is for vowels to surface as monophthongs. Optionally though, diphthongization occurs in morpheme-final VC sequences that meet the featural-mismatch conditions described in §3.2, even where they are followed by another morpheme. This is unexpected under the analysis as presented, because the motivation given for diphthongization is that there is no following vowel to realize the consonant's [back] or [pal] on. However, in the examples in (3.32), there is a following vowel, and the consonant's secondary feature is realized on it insofar as the quality of the vowel (which is epenthetic) is determined by vowel harmony principles which require it to take on a [back] or [pal] feature from the preceding consonant. We therefore need to account for the occurrence of diphthongization in a context where the [back] or [pal] feature is already being realized on the vowel following the consonant. More examples of this phenomenon can be found in §2.2.4 and §4.6.2.

(3.32) Optional overapplication of diphthongization (non-finally)

a. /t-a-lang^{pal}-*i*s/ → t-a-l**ai**ng-ius
CP-TV-cross-1
'I crossed (the road)' (3;89)

b. /t-a-chit-*a*s/ → t-a-ch**io**t-as
CP-TV-break-1
'I broke (it)' (2;12)

c. /t-a-jimb^{pal}-*i*s-*a*n/ → t-a-jimb-**io**s-an[4]
CP-TV-sweep-1-PL
'We (excl.) swept' (3;45)

One way to see the data in (3.32) is in terms of optional cyclic application. Diphthongization has the option to apply to the final syllable of the stem and to suffix,

[4] The fieldnotes indicate a more mid-vowel quality to the diphthong than would otherwise be expected before a voiceless fricative. This should be investigated phonetically.

without "seeing" rightward to following suffixes. In derivational terms, diphthongization can apply to the resulting form upon the addition of each affix, before further suffixes are added. If this type of optional cyclicity analysis is adopted, the analyses in §3.3 should probably be modified so that the [back] or [pal] feature does not delink from the original consonant, because it is still needed on the next cycle to correctly effect harmony on the following vowel.

A similar but alternative approach would be to pursue an Output-Output Correspondence analysis (Benua 1997), where suffixed forms are under paradigmatic pressure to be identical to morphologically related forms where the relevant syllables are word-final and hence subject to diphthongization.

In a different vein, it might be possible to see diphthongization in terms of functional contrast enhancement. Although the [back] or [pal] feature of a morpheme-final consonant can be realized on either the preceding or following vowel, the preceding vowel confers the advantage that it signals the plain or palatal status of the consonant ahead of time, giving the listener advance cues about what is coming up. This may facilitate perception and processing. Although I do not wish to make the teleological argument that speakers consciously make arbitrary changes in their speech to cater to the listener, variation arising from errors in production and perception are inherent to spoken language, and it is not unthinkable that fortuitously advantageous variants are more likely than others to be adopted and to increase in frequency over the course of language change (Blevins 2004).

Under a contrast enhancement view, diphthongization should be possible before any consonant that is contrastive for plainness and palatality. It would be obligatory or more likely to occur where there was no other way to cue the contrast (i.e. word-finally), and less necessary but still beneficial and thus possible in contexts where the contrast is realized in other ways as well (i.e. non-word-finally). This is not an analysis in itself, but rather a direction for an analysis which can be explored in future research.

In addition to contexts like those in (3.32) where diphthongization is found in unexpected places, there is the opposite case of forms where diphthongization is expected, but not found. This happens in verb forms, shown in (3.33), where the verb is followed by some kind of particle: a discourse particle in (3.33a), and a directional particle in (3.33b). Diphthongization is possible, as shown in the cited comparison tokens, but it is optional, and not obligatory as it is in other word-final contexts. One hypothesis is that further research on domains in Huave will reveal that the particle serves in some ways as the final syllable of the phonological word. The story cannot be that simple since both the verb-final syllable and the particle receive stress, indicating that they form separate metrical domains, but a unifying characteristic of (3.33a) and (3.33b) is that they form tight syntactic domains and are also very common collocations, facts which are perhaps not be lost on the phonology.

(3.33) Optional underapplication of diphthongization

a. /i-chij-r an/ → i-ch**i**r an (cf. *i-ch**iu**r an*, 1;85)
2-calm-2I just
'Calm down!' (2;94)

b. /i-kijp min/ → i-k**i** mion (cf. *s-a-k**iu** mion*, 3;85)
2-take from
'Bring (it)!' (1;172)

These two examples are the only ones I know of so far (there may be others), and they both have some factors besides a close syntactic relationship which potentially disfavor diphthongization. In (3.33b), the verb root is *-kiujp* /kijp/, containing an aspirated vowel and a coda consonant which are both dropped (see §2.1.3, §2.3.1). There could be variation in the interaction between this deletion and diphthongization: the surface absence of the final consonant may explain its failure to condition diphthongization. Still, one might also think that diphthongization should be even more important here in the name of contrast preservation, since the non-realization of the final [back] feature results in homophony with the root *-ki* 'tardar' (although there is no ambiguity in context since this root does not occur with directional particles).

In (3.33a), the root is *-chiuj* from underlying /-chij/. The aspiration is deleted by a regular phonological process (§2.5.3) upon concatenation of the second-person intransitive affix *-r*. The surface form is doubly surprising because aside from the lack of diphthongization in a word-final syllable with a plain coda consonant, we also get the normally forbidden sequence *-ir#*. In this case, since the following particle is vowel-initial, it is possible that the tight syntactic constituency permits resyllabification of the *r* into the next particle, so that there is no coda to trigger diphthongization. Again, though, this happens at the cost of non-realization of the consonant's contrastive backness or palatality feature, since the following vowel is not epenthetic and as such does not take on features from the preceding consonant.

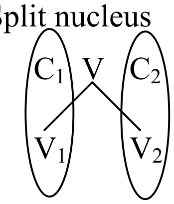
The examples in (3.32) and (3.33), where there are attested variants that contradict the basic analysis as developed in this chapter, raise the question of what the range of motivations and conditions is that affect diphthongization one way or the other, either favoring or disfavoring it. The basic analysis focuses principally on feature realization of secondary [back] and [pal] in positions where they cannot otherwise be realized. However, (3.32) and (3.33) serve as a reminder that there are other factors whose interaction and contributions to the process remain in need of thorough examination.

To return to the basic word-final syllable environment, there is probably more about coda (i.e. word-final) position that favors diphthongization than the simple fact that there is no following vowel on which to realize secondary [back] and [pal] features. One point that deserves mention is that all closed syllables are final, and therefore all closed syllables are stressed. Since stressed syllables tend to have longer durations, they favor diphthongs, since a longer nucleus can better accommodate the two distinct vowel phases (Zhang 2001). As mentioned in §3.5, the increased duration associated with stress may have worked in conjunction with anticipatory coarticulation to bring about diphthongization as a sound change, and the possibility of mutual reinforcement between duration and diphthongization on the synchronic plane could also be investigated in future research.

The fact that word-final consonants have only the preceding vowel (and no following one) to realize secondary features on can be seen as one aspect of a more general affinity between vowels and coda consonants, as compared with open-syllable vowels and the onset consonant of a following syllable. It may be possible to elaborate the basic analysis developed in this chapter to incorporate conditions on VC transitions. Such an analysis would potentially help to unify diphthongization with vowel harmony in a more exhaustive way than is possible with feature-realization constraints alone, as discussed in Chapter 4.

To briefly sketch out what such an analysis might look like, in (3.34) is a diagram where the vowel of a CVC syllable is split into two halves, which for convenience I will call V1 and V2, although the labels should not be taken to imply that there are two skeletal/prosodic vowel slots involved, given that there is no evidence for phonological vowel length. Making each half of the vowel separately visible to phonology would allow us to state conditions over the sequences C1V1 and V2C2: the quality of each half of the vowel could be manipulated with respect to the consonant without affecting the other half.

(3.34) Split nucleus



This would allow us to formalize the VC-"matching" condition mentioned above in §3.2, where VC sequences are required to match for the feature [pal] or [back]. In many cases, the outcome of both kinds of diphthongization is that each half matches its neighboring consonant in these features. For V_2C_2 transitions, this is true at least at any level aside from the most surfacy one(s) where secondary [pal] or [bk] has delinked from the consonant, given that these features cannot phonetically be realized on the consonant itself. For C_1V_1 transitions, matching is not strictly possible for C_1 that do not bear a [pal] or [bk] feature, which is all consonants aside from the inherent palatals {*ty ndy ñ ly x ch nch*}*;* the most that can be said is there is no overt conflict (cf. §4.3). In (3.35) I label the transitions as [back] or [pal to illustrate the general idea, though the issues just mentioned should be kept in mind.

(3.35) Diphthongization as transition optimization

a. Front-vowel diphthongization

/chik^{bk}/

ch i	o k
C_1 V_1	V_2 C_2
[pal]	[back]

‘mojarra fish’

b. Back-vowel diphthongization

/puk^{pal}/

p u	i k
C_1 V_1	V_2 C_2
[back]	[pal]

‘feather’

Of course, the central reason why an analysis based on VC-matching was abandoned above in favor of the feature-realization analysis is because of the (3.11) context of back vowels before inherent palatals, where diphthongization does not occur and a VC-matching condition would not be able to account for why (unless, possibly, it were to be formulated solely over secondary features as a “don’t mismatch” condition, so that back vowels would be compatible with inherent palatals, which lack a secondary feature; cf §4.3).

What I am suggesting rather is that conditions on V_2C_2 transitions might be incorporated into a fuller analysis where they are viewed as working in conjunction with feature-realization requirements to produce diphthongization. For example, they could potentially be used in the formal analysis of examples like (3.32) where features are multiply realized. Additionally, conditions on transitions might be useful for the analysis of the raised diphthong *iu* that occurs before voiceless fricatives. Constraints on transitions do seem to have some independent motivation, as we saw in (3.12), so future research may uncover interesting complexities with regard to their role in diphthongization. Whether feature realization is really a driving force of diphthongization, or emergent from the repair strategies used to satisfy constraints on transitions, remains to be seen.

Another example of a phenomenon where conditions on transitions work together with requirements for contrast maintenance and enhancement is the insertion of oral stop phases between oral and nasal segments in languages with contrastive nasalization (Anderson 1976, Herbert 1986, Flemming 2004). In the Gê language Kaingang, nasal consonants can only directly abut nasal vowels. When nasal consonants are adjacent to oral vowels, an oral stop arises as a sort of buffer, in much the same way that secondary-feature realization in Huave has the effect of creating a "buffer" between a vowel and consonant that do not match for [back] or [pal]. More specifically, such "buffers" serve the purpose of contrast enhancement, to ensure that oral vowels are properly maintained as oral next to a nasal consonant that otherwise might have a contrast-diminishing nasal coarticulatory effect on it. The mechanism in (3.34) that allows phonology to refer to segment edges might profitably be combined with Flemming's (2004) constraints on contrast for a more detailed analysis of patterns like this in Kaingang, Huave, and other languages. Note that in Kaingang, orality is manifested on the transition in addition to on oral vowels, in contrast to Huave, where palatality or backness is manifested only on the transition and not on the consonant from which it originates.

(3.36) Kaingang nasal/oral transitions (from Flemming 2004)

a. $\tilde{V}m\tilde{V}$
b. $\tilde{V}m^{b}V$
c. $V^{b}m\tilde{V}$
d. $V^{b}m^{b}V$

The Kaingang example has another interesting thing in common with Huave, which is that an "unmarked" feature value - in Kaingang, lack of nasality on vowels and in Huave, lack of palatalization on consonants - manifests itself overtly in a new segment, or part of a segment, that is created on the surface. By the criteria in §3.3, these feature values should be specified so that they can be referred to by the phonology in the formulation of the relevant processes and their outcomes. Even though not all possible analyses would require formal reference to a [-nasal] feature, the empirical question behind these questions of feature specification is whether the unmarked value ever conditions a process, and in the Kaingang case the oral vowel does condition the "oralization" of the transition or the denasalization of part of the nasal consonant, (whichever turns out to be a more accurate characterization). Similarly in Huave, it seems to be an unavoidable empirical fact that plain consonants condition diphthongization. Note that in both Huave and Kaingang, it is a contrast between the unmarked and marked feature values that causes the unmarked value to participate in active enhancement processes (cf. Herbert 1986, Flemming 2004).

Huave thus contributes to a body of literature on phenomena where "unmarked" feature values are active phonologically, strengthening the case that explanations should be found for both their existence and their relative rarity, perhaps along the lines of contrast preservation enhancement as explored from various angles by e.g. Lubowicz (2003), Flemming (2004). Aside from non-palatality (backness) in Huave and non-nasality (orality) in Kaingang, examples of phonologically active status have been found for [-voice] (Wetzels & Mascaró 2001) and [-round] (Hyman 2002).

Binary feature specifications along with the possibility of underspecification predict three-way distinctions for plus, minus, and zero feature values (Stanley 1967). Such three-way oppositions have been argued to exist e.g. on the frontness/backness dimension in Turkish (Clements & Sezer 1982), and voicing in Makkan Arabic

(Wetzels & Mascaro 2001). Another prediction is that while Huave opposes [pal] and [back], other languages' palatal/nonpalatal consonant oppositions will be specifed [pal] and zero, with attendant differences in phonological behavior. This would presumably be the case in many languages with palatalized consonants, where consonant plainness does not trigger any phonological processes.

Huave can also contribute to the typological (and by extension, theoretical) literature on diphthongs and diphthongization. In particular, front-vowel diphthongization is one of not very many cross-linguistic examples of synchronic vowel breaking alternations (as opposed to vowel breaking as a sound change), where neither half of the resultant diphthong is identical to the original monophthong. The question of what phonological factors can and cannot condition vowel breaking alternations is an open one. The breaking in Huave seems to be conditioned by a more complex interplay of factors than in other known cases, such as breaking in Lund Swedish which is conditioned by stress (Hayes 1990), and Gur languages where the presence of any following consonant at all (whether in syllable coda or in the onset of a following syllable) is sufficient to trigger breaking (Ulrich 1994).

The Huave pattern of diphthongization forms a bridge between studies of diphthongization on the one hand, and linearization of subsegmental and other phonological material on the other. The metathetic realization of palatalization is also attested in Mixe (Van Haitsma & Van Haitsma 1976:10, Hoogshagen and Bartholomew 1993:342-344) and Maxakali (Gudschinsky, et al. 1970, Wetzels & Sluyters 1995), and is reminiscent of Austronesian metatheses (Blevins & Garrett 1998). These examples in turn are part of a typology of phonological metatheses of secondary articulations in general, such as glottalization metathesis (see Blevins & Garrett 2004). Further research on Huave diphthongization as it relates to metathesis and linearization may reveal consequences for theories in these areas, due to complexities such as the difference between inherent and secondary palatalization, and the optionality of diphthongization in contexts such as those illustrated in (3.32) and (3.33).

Chapter 4

Vowel harmony

4.1 Overview

Epenthetic vowels are found in almost every suffixed Huave verb form, due to the fact that most roots are consonant-final, most suffixes consist of single consonants, and clusters are generally prohibited. Vowel epenthesis is necessary to ensure open syllables non-finally and a maximum of one coda consonant in word-final position. In this chapter, I will explore the patterns and principles behind the surface quality of epenthetic vowels. Since epenthetic vowel quality is determined by the quality of the preceding vowel, as well as features of the intervening consonant, I will refer to this as a vowel harmony (vowel-to-vowel assimilation) phenomenon. Within vowel harmony, I will show that it falls into the subcategory of vowel copy. Complexities arise from interactions between vowel harmony and requirements for the surface expression of the plain/palatal contrast on morpheme-final consonants (which, as we have seen in Chapter 3, also plays a major role in diphthongization).

More specifically, epenthetic vowels obligatorily take on the [back] or [pal] features of the preceding consonant: epenthetic vowels after plain consonants must be back, and those after phonologically palatalized consonants must be front. Epenthetic vowels can thus be seen as cueing the phonological plain/palatal status of an adjacent consonant, enabling preservation of the contrast. Along with diphthongization, this is a manifestation of the generalization that secondary [back] and [pal] on consonants are realized not on the consonants themselves, but rather on adjacent vowel nuclei.

Vowel copy from the preceding syllable is licensed wherever a copy vowel would meet this central requirement. Thus back vowels are copied across plain consonants (4.1a), and front vowels are copied across palatalized consonants (4.1c). However, back vowels cannot be copied across palatalized consonants (4.1b), and front vowels cannot be copied across plain consonants (4.1d). In these cases, default vowels are found: *a* after [back] consonants and *i* after [pal] consonants. (For clarity, the front vowels in (4.1bc) are shown at a pre-diphthongization stage, with actual surface forms on the right. The forms in (4.1cd) also show aspiration weakening; see §2.5.4.)

(4.1) Copy vs. blocking

a. /t-a-m**o**ng$^{\mathbf{bk}}$-Vs/ → t-a-mong-**o**s
CP-TV-pass-1
'I passed by' (4;15)

b. /t-a-l**o**ng$^{\mathbf{pal}}$-Vs/ → |t-a-long-**i**s| → t-a-long-ius
CP-TV-hang-1
'I hung (it)' (3;45)

c. /t-a-j.chik^{pal}-Vs/ → |t-a-j.chik-**i**s| → t-a-chik-ius
CP-TV-jump-1
'I jumped' (4;14)

d. /t-a-j.mik^{bk}-Vs/ → |t-a-j.mik-**a**s| → t-a-mik-as
CP-TV-descend-1
'I came down' (4;14)

The analysis developed in this chapter is that epenthetic vowels directly realize the secondary [back] and [pal] features of neighboring consonants. The direct realization approach is distinguished from an approach based solely on CV agreement for [back] or [pal], which would fail to capture generalizations about vowel epenthesis in infixes, and lead to incorrect predictions elsewhere in the phonology. Nevertheless, conditions on CV transitions are needed as part of an analysis that also involves feature realization. Like in diphthongization, the two factors interact.

Vowel copy is a robust process, but it is sometimes blocked from happening because it is trumped by the CV conditions. Of particular interest is the fact that vowel copy is all-or-nothing: incompatibility on a single featural dimension (back or front) prevents vowel-to-vowel assimilation of any features at all, including unrelated ones such as height. I show that the Huave pattern, which is typologically unusual, contradicts the predictions of traditional autosegmental spreading theories of long-distance assimilation. Meanwhile, the pattern is easily captured (and independently predicted) by a constraint-based analysis using string-internal Correspondence (Hansson 2001, Rose and Walker 2004). The proposed analysis opens new directions for the conceptualization of long-distance interactions in phonology.

The structure of this chapter is as follows. In §4.2, I start by presenting the data and basic patterns to be accounted for. In §4.3 and §4.4 I develop an analysis of Huave vowel harmony in terms of interacting constraints, which are presented in general terms as well as formalized in Optimality Theory. Alternative analyses based on traditional spreading and blocking of autosegmental features are considered in §4.5, and some disadvantages relative to the constraint-based approach are discussed. Some further issues in Huave vowel harmony, and possible solutions, are laid out in §4.6. Lastly, in §4.7 I discuss the broader theoretical and typological consequences of Huave in relation to previous data and proposals from the vowel harmony literature.

4.2 Data and patterns

The basic problem in Huave vowel harmony is to account for the contexts where epenthetic vowels are copies of the preceding vowel, versus the contexts where vowel copy is blocked. Where vowel copy is blocked, we must furthermore account for how else the epenthetic vowels get their features. It is therefore necessary to begin by examining data to make descriptive generalizations in each of these areas.

4.2.1 Suffix harmony

The phonological contexts for vowel epenthesis in suffixes where we find full vowel copy are illustrated in (4.2). Examples consist of roots with the third-person suffix *-f/-w/-j/-Ø* (allomorphy is phonologically conditioned; see §2.5.2), with epenthetic vowels appearing before the third-person suffix. Note that before plain word-final consonants, front vowels *i* and *e* diphthongize; *io* and *iu* in this context can be considered copies of *i*, and *ia* a copy of *e* (see Chapter 3).

The generalization is that vowel copy occurs wherever the VC sequence preceding the epenthetic vowel agrees for the feature [back] or [pal]. The table is organized so that we can see examples of vowel copy for all five vowels: in (4.2a-f) for both front vowels where they precede palatalized ("front") consonants before an epenthetic copy vowel, and in (4.2g-l) for all three back vowels where they precede plain ("back") consonants before an epenthetic copy vowel. The plain vs. palatal status of the root-final consonants can independently be diagnosed via their ability or failure to trigger diphthongization when word-final.

(4.2) Vowel copy

	Front V/C^{pal}		Back V/C^{bk}
a.	/-jimb^{pal}/ t-a-j**i**mb-**iu**f CP-TV-sweep-3PL 'they swept (it)' (3;45)	g.	/-mal^{bk}/ a-m**a**l-**a**f TV-carry.head-3PL 'they carry (it) on their heads' (2;74)
b.	/-xip^{pal}/ t-a-x**i**p-**iu**f CP-TV-get.fat-3PL 'they fattened up' (3;41)	h.	/-jants^{bk}/ a-j**a**nts-**a**f TV-wash-3PL 'they wash (it)' (2;65)

c.	/-j.lits^{pal}/ t-a-j.l**i**ch-**iu**f CP-TV-fall-3PL ‘they fell’ (3;52)	i.	/-ndok^{bk}/ m-a-nd**o**k-**o**j SB-TV-fish-3PL ‘(that) they fish (it)’ (1;91)
d.	/-ken^{pal}/ a-k**e**ñ-**ia**f TV-carry.hip-3PL ‘they carry (it) on their hips’ (2;75)	j.	/-xojt^{bk}/ t-a-x**o**jt-**o**Ø CP-TV-rest-3PL ‘they rested’ (3;43)
e.	/-pejk^{pal}/ t-a-p**e**jk-**ia**w CP-TV-stoke-3PL ‘they stoked (the fire)’ (3;41)	k.	/-xum^{bk}/ a-x**u**m-**u**j TV-find-3PL ‘they find (it)’ (2;65)
f.	/-xeng^{pal}/ m-a-x**e**ng-**ia**f SB-TV-raise-3PL ‘(that) they raise (it)’ (2;151)	l.	/-lyup^{bk}/ i-m-a-ly**u**p-**u**j FT-SB-TV-soak-3PL ‘they would soak (it)’ (2;43)

The table in (4.3) shows the complementary set of contexts where epenthetic vowels are not copies of the preceding syllable’s vowel. Vowel copy is blocked wherever the VC sequence preceding the epenthetic vowel disagrees in value for [back] or [pal], either where the vowel is front and the consonant plain (4.3a-f), or where the vowel is back and the consonant palatalized (4.3g-l). Instead, the epenthetic vowel surfaces as *a* after plain consonants (4.3a-f), and *i* after palatalized consonants (4.3g-l).

(4.3) Blocking of vowel copy

	Front V/C^{bk}		Back V/C^{pal}
a.	/-jing^{bk}/ a-j**i**ng-**a**f TV-dance-3PL ‘they dance’ (0801519-Be9)	g.	/-tats^{pal}/ m-a-t**a**ch-**iu**f SB-TV-reach-3PL ‘(that) they reach (it)’ (3;3)
b.	/-chit^{bk}/ m-a-ch**i**t-**a**f SB-TV-break-3PL ‘(that) they rip (cloth)’ (080519-Be9)	h.	/-tsand^{pal}/ m-a-ts**a**nd-**iu**f SB-TV-hit-3PL ‘(that) they play music’ (3;5)
c.	/-ndim^{bk}/ t-a-nd**i**m-**a**f CP-TV-want-3PL ‘they wanted’ (3;3)	i.	/-kots^{pal}/ a-k**o**ch-**iu**f TV-scratch-3PL ‘they scratch (it)’ (3;42)

d.	/-kwir^{bk}/ dy-a-kw**ir**-**a**f PROG-TV-run-3PL 'they are running' (2;13)	j.	/-ojt^{pal}/ t-a-**o**jt-**io**w CP-TV-dig-3PL 'they dig (it)' (1;175)
e.	/-mejts^{bk}/ u-m**e**jts-**a**w POS1-heart-3PL 'their hearts' (3;27)	k.	/-mbul^{pal}/ a-mb**u**l-**iu**f TV-burn-3PL 'they burn (it)' (3;19)
f.	/-ndek^{bk}/ a-nd**ia**k-**a**f TV-speak-3PL 'they speak' (2;65)	l.	/-un^{pal}/ t-a-**uñ**-**iu**f CP-TV-buy-3PL 'they bought (it)' (3;44)

A generalization running through both (4.2) and (4.3) is that the epenthetic vowel is always back after a plain consonant, and always front after a palatalized consonant: it always has the same [back] or [pal] value as the underlying consonant that precedes it. This can be seen in the composite table in (4.4), which is organized with all the plain-consonant environments on the left, and all the palatalized-consonant environments on the right. We may consider it an inviolable condition on epenthetic vowels that they must match the preceding consonant in backness or palatality. As long as this condition can be met, the epenthetic vowel will be a copy of the preceding syllable's vowel, as seen in the lower-left and upper-right quadrants of (4.4). However, if the preceding syllable's vowel has one of [back] or [pal] while the intervening consonant has the other, it follows as a logical corollary that any copy of the vowel will also not match the intervening consonant, thus violating the condition. For instance, if the vowel *a* were copied across a palatalized consonant, the resulting configuration /aC^{pal}-a/ would not be legal.

Another way of putting this is that there are three sources of features for completely underspecified epenthetic vowels: the preceding consonant, the preceding vowel, or default feature fill-in. The highest-priority source is the preceding consonant, which contributes [back] or [pal]. Although the epenthetic vowel prefers to be a copy of the preceding vowel, this is only possible where the preceding vowel's value of [back] or [pal] does not conflict with the one that is already required. If there is a conflict in this one feature, the epenthetic vowel does not take any features at all from the preceding vowel, and features creating default vowels are inserted instead. The default [back] vowel is *a*, and the default [pal] vowel is *i*.

(4.4) Vowel harmony: overview

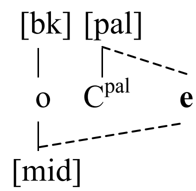
Base -VC	Epenthetic V	Base -VC	Epenthetic V
iC^{bk}	a	iC^{pal}	i
eC^{bk}	a	eC^{pal}	e
aC^{bk}	a	aC^{pal}	i
oC^{bk}	o	oC^{pal}	i
uC^{bk}	u	uC^{pal}	i

Importantly, all it takes to trigger default vowel insertion is incompatibility on the backness/palatality dimension. Although it would in principle be possible to take [back] or [pal] from the consonant while taking other features (e.g. height) from the vowel, as in (4.5a), incompatibility for the [back]/[pal] feature cancels vowel-to-vowel assimilation altogether. Following Padgett (1995), this can be termed a "sour grapes" pattern of blocking. The non-assimilation of height features is notable due to the evidence from vowel copy that there is pressure to assimilate all vowel features, especially given that assimilation of height features would not cause any known phonotactic problem. The failure to spread/copy height features, as in (4.5b), is anthropomorphized by the "sour grapes" label as due not to any ill-formedness of height feature spreading, but to a blanket grudge over the epenthetic vowel's inability to take the preceding vowel's backness or palatality feature. The "good sport" pattern in the

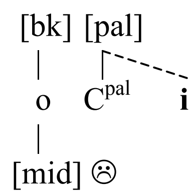
(4.5a) example is known in the literature as partial class behavior (Padgett 1995). While partial class behavior is attested in several other of the world's harmony systems (Odden 1991; Halle, Vaux & Wolfe 2000), Huave is one of the first examples in the literature (if not the first) of a sour grapes pattern in vowel-to-vowel assimilation. We will return to this point below in the analysis.

(4.5) Partial class behavior vs. sour grapes[1]

a. Partial class behavior



b. Sour grapes



Additional descriptive points to cover are the domain and directionality of vowel harmony. The quality of epenthetic vowels is sensitive only to features in the immediately preceding VC sequence, and not to any segments before that. Each pair of adjacent syllables therefore forms its own highly local domain. In this way, Huave is different from harmony systems where the harmonizing feature value agrees on all relevant segments within a larger domain such as the word. Where there is a string of suffixes with epenthetic vowels, each syllable determines the epenthetic vowel quality of the following syllable, in a left-to-right chain.

To illustrate this, some words with multiple epenthetic vowels are shown in (4.6). In (4.6a), a default front vowel *i* is epenthesized in the causative suffix *-jch*,

[1] The height feature [mid] is a simplification, used here for expositional clarity. In §3.4 I motivate a more nuanced representation of vowel height; the differences do not affect the point currently under discussion.

because the final consonant of the root /chup^{pal}/ is palatalized (but preceded by a back vowel, which prevents vowel copy). Because the causative *-ijch* contains a VC sequence that matches for [pal], *i* can be copied into the next epenthetic vowel slot, in the first-person suffix. In (4.6b), however, we see that since the first-person suffix is a plain consonant, the front vowel cannot be propagated anymore, and upon further suffixation the plain consonant causes epenthesis of the default back vowel *a*. In (4.6c), in contrast to the previous two examples, the root-final plain consonant causes epenthesis of a back vowel before the causative suffix, which furthermore copies all the features of the root vowel since the root vowel is also back. When the first-person suffix is added, the palatality of causative *-jch* causes the epenthetic vowel to be the default front vowel *i*.

(4.6) Locality of vowel harmony domain

a. t-a-chup-ijch-ius /t-a-chup^{pal}-Vjch-Vs/
CP-TV-fill-CAUS-1
'I filled (it)' (1;170)

b. t-a-chup-ijch-is-an /t-a-chup^{pal}-Vjch-Vs-Vn/
CP-TV-fill-CAUS-1-PL
'We (excl.) filled (it)' (1;170)

c. t-a-mbol-ojch-ius /t-a-mbol^{bk}-Vjch-Vs/
CP-TV-fear-CAUS-1
'I frightened him/her' (4;12)

The words in (4.7) contain the completive prefix *t-*, theme vowel *a-*, and root, to which are added two suffixes: the first-person *-s* and plural *-n*, both of which introduce epenthetic vowels. A full set of examples is given to show how only back vowels can be epenthesized after plain -s, regardless of the vowel and final consonant of the root.

(4.7) Suffix chains

	Root-final C^{bk}		Root-final C^{pal}
a.	t-a-j.miok-as-an /-mik^{bk}/ CP-TV-descend-1-PL 'we (excl.) came down' (4;14)	f.	t-a-j.chik-is-an /-j.chik^{pal}/ CP-TV-jump-1-PL 'we (excl.) jumped' (4;14)
b.	t-a-ndiak-as-an /-ndek^{bk}/ CP-TV-speak-1-PL 'we (excl.) spoke' (2;99)	g.	t-a-rrejk-ias-an[2] /-rrejk^{pal}/ CP-TV-touch-1-PL 'we (excl.) touched (it)' (2;94)
c.	t-a-rang-as-an /-rang^{bk}/ CP-TV-do-1-PL 'we (excl.) did (it)' (1;129)	h.	t-a-wañ-is-an /-wan^{pal}/ CP-TV-take.out-1-PL 'we (excl.) took (it) out' (4;6)
d.	t-a-j.ngot-os-on /-j.ngot^{bk}/ CP-TV-come-1-PL 'we (excl.) came' (4;15)	i.	t-a-ngoch-is-an /-ngots^{pal}/ CP-TV-answer-1-PL 'we (excl.) answered (it)' (4;15)
e.	t-a-mut-us-un /-mut^{bk}/ CP-TV-write-1-PL 'we (excl.) wrote (it)' (2;99)	j.	t-a-j.mul-is-an /-j.mul^{pal}/ CP-TV-enter-1-PL 'we (excl.) entered' (4;14)

A question that frequently comes up in suffixal vowel harmony is whether harmony is truly left-to-right, or whether the directionality derives from morphological conditions, e.g. root-control (Bakovic 2000). In Huave, there are no prefixal vowels that undergo harmony, so there is no firm evidence for any right-to-left vowel harmony originating from the root.

However, there is a small piece of evidence that prefixes, specifically the second-person prefix vowel *e*-, cannot trigger vowel harmony. In (4.8b), the root consists of a single, palatal consonant, so that the VC sequence preceding the epenthetic vowel consists of a prefix vowel and root consonant, instead of two root segments. The epenthetic vowel appears to be sensitive only to the root consonant, inserting the default vowel quality for the palatal context. Although the *e*- prefix was pronounced in this token as [i], the related form in (4.8a) given during the same paradigm elicitation

[2] This is the only example of an /-eC^{pal}/ root I have been able to find in my data in the relevant morphological form. However, I note that it was a form supplied by me which the speaker judged to be correct; the penultimate diphthongization in particular may or may not have been produced by the speaker spontaneously.

session suggests that the [i] quality is due to unstressed vowel reduction (§2.3.3) rather than the second-person allomorph *i-*. The second-person prefix occupies morphological Layer 1, hierarchically closer to the root than the Layer 4 plural suffix (see Chapter 7), so it is not possible to have a derivational analysis where epenthetic vowel quality is determined at an intermediate stage before the attachment of the prefix. Due to the paucity of data (a single token from a single speaker) this pattern will not be incorporated into the formal analysis until it can be confirmed by further data, but it does indicate potential morphological sensitivity in the vowel harmony process.

(4.8) Vowel harmony blind to prefixes?

a. i-m-e-jch
FT-SB-2-give
'you (sg.) will give' (1;174)

b. i-m-e-jch-ion /i-m-e-jch-Vn/
FT-SB-2-give-PL
'you (pl.) will give' (1;174)

There is also marginal evidence for some right-to-left vowel-to-vowel assimilation, however, although it is not necessarily related to the pattern currently under discussion. The future prefix is normally *i-*, in first-person (exclusive) forms only, but some speakers (typically younger ones) also use *a-*. This happens only when the following theme vowel is *a-*, never with the theme vowel *u-*. The correct morphological analysis of *xa-* in first-person future forms, and exactly how it relates to the regular *x-i-* forms, is not clear, but the relevant fact is that there seems to be a phonological condition on its occurrence. Additionally, in (4.9c) is a form given by a semifluent speaker, which shows apparent right-to-left vowel copy. This is the only example I have of such a form, and it is not known whether it reflects a pattern that is (or was once) in wider use. Incidentally, there is loanword evidence of bidirectional root-internal vowel assimilation at an earlier stage of the language; see §2.6. The relationship of these vowel-vowel assimilations to epenthetic vowel harmony as discussed here is not yet clear, though, so although it may eventually be possible to typologize Huave vowel harmony as either left-to-right or root-controlled, no way has been found yet of distinguishing between these two possibilities.

(4.9) Right-to-left V-V assimilation?

a. x-a-n-a-kaj
1-FT-1SB-TV-look.for
'I'll look for (it)' (2;126)

b. x-i-ñ-u-jants
1-FT-1SB-TV-wash
'I'll do the wash' (060131-Ep3)

c. x-u-ñ-u-ty
1-FT-1SB-TV-eat
'I will eat' (1;96)

4.2.2 Infix harmony

Another set of data relevant to the discussion of vowel harmony, although it is found only in a single, non-productive morphological context, is epenthetic vowel quality in the passivizing infix -rV-, described in §6.4.3.1. This infix is inserted between the vowel and final consonant of the root, such that a CVC root takes on the shape CV-rV-C, where the vowel of the infix is determined by the features of neighboring segments. The principles of infix harmony are, for all the phonological contexts where there is data, exactly the same ones we have seen in the suffixal data: the quality of the epenthetic vowel depends on the quality of the root vowel, and on the [back] or [pal] feature of the final consonant.

The infixed forms in (4.10) are examples of where the root vowel is copied into the infix. In the familiar pattern, full copy happens where the root vowel and root-final consonant have the same value of [back] or [pal]: in roots with a front vowel and palatalized final consonant, and in roots with a back vowel and plain final consonant.

(4.10) Infixation of *-rV(j)-* with vowel copy

	Front V/C^{pal}		Back V/C^{bk}
a.	i-m-a-j**i**.r**i**.m /-jimb^{pal}/ FT-SB-TV-sweep.PASS 'it will be swept' (3;26)	c.	dyu-s**a**-r**a**j-p /-sap^{bk}/ PROG-catch.PASS 'it is being caught' (2;106)
b.	a-x**e**.r**e**.ng /-xeng^{pal}/ TV-raise.PASS 'it is raised' (2;118)	d.	a-nd**o**.r**o**.k /-ndok^{bk}/ TV-fish.PASS 'it is fished' (2;109)
		e.	t-a-x**u**.r**u**.m /-xum^{bk}/ CP-TV-find.PASS 'it was found' (2;97)

Meanwhile, the default back vowel *a* is inserted if the root-final consonant is plain, i.e. [back], but the root vowel is front (i.e. not [back]). As for the opposite mismatch context, where the root has a back vowel and palatalized final consonant, I have no attested roots of this phonological shape with the -rV- infix.

(4.11) Infixation with default vowels

	Front V/C^{bk}		Back V/C^{pal}
a.	a-nd**i**.r**a**.m /-ndim^{bk}/ TV-want.PASS 'it is wanted, desirable' (2;129)		/-Ca.rV.C^{pal}/ unattested
b.	t-a-m**i**.r**a**j.t /-mit^{bk}/ CP-TV-bury.PASS 'it was buried' (2;119)		/-Co.rV.C^{pal}/ unattested
c.	m-a-nd**ia**.r**a**.k /-ndek^{bk}/ SB-TV-speak.PASS '(that) it is spoken' (2;93)		/-Cu.rV.C^{pal}/ unattested

The table in (4.12) summarizes the infix data. Even though the infix only occurs non-productively and with a small number of roots, the fact that none of the combinatorial possibilities in the lower-right quadrant of (4.12) is attested, while all the others are, raises suspicions that this may be a principled gap. The reasons for the gap are not entirely clear, but are worthy of future exploration. In any event, infix vowels have “sour grapes” default vowel quality in all attested cases where the V and final C of the root do not match in backness; it is the same pattern as in suffix harmony.

(4.12) Infix harmony: summary

Root Vowel	Infix Vowel	Final C	Root Vowel	Infix Vowel	Final C
i	a	C^{bk}	i	i	C^{pal}
e	a	C^{bk}	e	e	C^{pal}
a	a	C^{bk}	a	N/A	C^{pal}
o	o	C^{bk}	o	N/A	C^{pal}
u	u	C^{bk}	u	N/A	C^{pal}

With infixes, the crucial difference from suffix harmony is that the root-final consonant comes *after* the epenthetic vowel, rather than before it. Unlike with suffixes, the consonant *r* that intervenes between the potentially harmonizing vowels is totally inert. Therefore an analysis based solely on the phonological features of the VC sequence preceding the epenthetic vowel cannot be the full story. An observation that will come into play for the analysis is that the infix consonant *r*, being morpheme-initial and not morpheme-final, bears no secondary [back] or [pal] feature, so the epenthetic vowel slot has only one adjacent consonant with a secondary feature - the one after it. To the extent that epenthetic vowels acquire [back] or [pal] from a neighboring consonant, and/or the [back]/[pal] feature of a neighboring consonant is in need of a vocalic vehicle for surface realization, there will thus be a VC interaction in the infix context.

More generally, the infix pattern is striking because while CV interactions in Huave take place not just in suffix harmony but also in morpheme structure constraints and allophonic palatalization (§2.2.1), infix harmony is the only known phoneme-level VC interaction in the language. On the other hand, constraints on the surface realization of VC transitions are well attested in diphthongization. The connection, explored further below, seems again to lie in the pressure to realize the secondary [back] and [pal] of consonants.

4.3 Analysis

The main idea of the analysis to be explored here is that the Huave pattern of vowel harmony and blocking can be modeled as the interaction of various independent constraints, requirements and preferences in the phonology. An account is offered of the priorities and methods by which conflicts between these competing pressures are resolved. Such an analysis naturally lends itself to formulation in Optimality-Theoretic terms, although the main intention of the (partial) formalization is to serve as a heuristic in the working-out of the principles behind the system observed. I will first motivate a constraint schema in very general terms, mostly following the generalizations already discussed, then go back and take a closer look at the correct formulation of each component. Informal constraints, i.e. those remaining to be fully unpacked, are written in normal script, while the more established constraints are written in small caps.

The basis of the vowel harmony system is vowel copy, or the propensity for epenthetic vowels to copy all features from the preceding vowel. I formulate this tendency as a constraint enforcing identity in all features in vowels of neighboring syllables (4.13a). Obviously, most multisyllable words do not have the same vowel in each syllable; this is due to the fact that non-epenthetic vowels have underlyingly specified featural content that cannot be overridden by vowel copy. The ranking of an input-output faithfulness constraint MAX ("preserve input features") over VowelCopy expresses that underlyingly specified vowels will copy features onto underlyingly underspecified, epenthetic vowels. It prevents the situation where features acquired by the epenthetic vowel would be backcopied onto a lexically specified vowel.[3]

(4.13) a. VowelCopy: Vowels in adjacent syllables should be identical in all features.
b. MAX: Input features should have a correspondent in the output.
c. MAX >> VowelCopy

Abstracting away to base-final VC sequences followed by an epenthetic vowel, we see in the following tableau that candidate (a) violates MAX because the underlying [pal] feature cannot find expression either on the consonant (due to highly ranked markedness constraints not shown), or on the epenthetic vowel. Similarly, candidate (c) incurs a MAX violation by replacing features of the underlying /u/. Candidate (b) wins because it allows the [pal] feature to be realized on the surface, at the expense of violating the lower-ranked VowelCopy.

(4.14) MAX >> VowelCopy

/uk^{pal}+V/	MAX	VowelCopy
a. uk-u	*!	
b. ☞ uk-i		*
c. ik-i	*!	

However, MAX is not sufficient to predict the winner once we consider the full context. This is because epenthetic vowels actually have two adjacent consonants with [back] or [pal] features: the morpheme-final consonant from the preceding morpheme,

3 In principle, because some vowels simply have more features than others as analyzed in §3.4, this constraint ranking could result vowel changes that come about through the addition of features to already-specified vowels, for example in prefixed words. Although I have touched on the topic of such vowel-vowel assimilations in §2.6 and §4.2.1, those may be different phenomena, and the analysis in this chapter is meant to cover only epenthetic vowels. It is hoped that a fuller investigation will in the future enable either a modified, unified analysis of all vowel-vowel relationships, or justify on more specific grounds separate analyses for the different contexts.

and the morpheme-final consonant after it that occasioned epenthesis in the first place (recall that consonantal suffixes are all single-segment). In principle, it would be possible for the epenthetic vowel to acquire a backness/palatality feature from the consonant after it, rather than from its onset. The current constraint ranking makes the wrong prediction in (4.15). Because the consonants surrounding the epenthetic vowel disagree for [bk]/[pal], there will be a MAX violation no matter what vowel is chosen. VowelCopy can thus take over to determine the winner.

(4.15) MAX >> VowelCopy: Problems

/uk^{pal}-Vs^{bk}/	MAX	VowelCopy
a. 💣 uk-us	*	
b. ☹ uk-is	*	*!
c. ik-is	**!	

We need criteria to distinguish the well-formedness of surface forms where [back] or [pal] comes from the preceding consonant, versus those where it comes from the following one. The fact that we get (4.15) instead of (4.15) shows that there is a preference for acquiring features from the preceding consonant.

More evidence for such a preference arises when the epenthetic vowel follows a root that ends in a palatal coronal. Since palatal coronals have [pal] as primary place of articulation, [pal] is realized on the consonant and does not need to manifest itself on a neighboring vowel in order to satisfy MAX. These examples also show that epenthetic vowels prefer to take a [pal] feature from a preceding consonant, independently of the surface-realization requirement on [back] and [pal] features.

(4.16) MAX >> VowelCopy: More problems

/ut^{pal}-Vs^{bk}/	MAX	VowelCopy
a. 💣 uty-us		
b. ☹ uty-is	*	*!

To encapsulate the preference for CV over VC assimilation, I will use the somewhat crude constraint in (4.17a). It is a constraint against CV sequences where one segment has the feature [back] and the other has [pal]. It is not a formal proposal for a new constraint; rather, I leave closer elaboration of its content for future research. I have formulated it as a "Don't Disagree" rather than an AGREE constraint type because a CV-AGREE constraint is not motivated in the language when we look at morpheme-internal CV sequences. Since non-morpheme-final consonants do not take secondary [back] and [pal] features, it is impossible for them to satisfy an AGREE constraint that would require them to have such features in order to match the following vowel.

The other difference between epenthetic and non-epenthetic contexts is that in vowel epenthesis, palatalized consonants are only compatible with front vowels, whereas elsewhere, coronals must palatalize before the back high vowel *u*. If the CV agreement apparently at work in vowel epenthesis were the same as elsewhere, we would erroneously predict that *u* could copy across palatalized consonants as in candidate (4.16a). While this difference is a problem for both CV-Agree and *CV-Disagree, the latter is a more flexible constraint that may eventually be usable in a more comprehensive analysis of CV sequences in Huave, whereas the former is violated often enough that it may not be generalizable even in a lower-ranked capacity.

(4.17) a. *CV-Disagree: $*C^{bk}V_{pal}$, $*C^{pal}V_{bk}$
b. *CV-Disagree >> MAX

The ranking in (4.17b) gives the observed result of left-to-right assimilation, as shown in the tableau in (4.18).

(4.18) *CV-Disagree >> MAX >> VowelCopy

/ut^{pal}-Vs^{bk}/	*CV-Disagree	MAX	VowelCopy
a. uty-us	*!		
b. ☞ uty-is		*	*
c. ity-is		**!	

Lastly, there is the problem of how the epenthetic vowel gets its remaining features - the ones besides [pal] or [back] - in cases where vowel copy is not possible. Consonants are not specified for the remaining feature types (height, rounding), and due to the sour grapes pattern, we observe that they do not come from the preceding syllable's vowel. The other features must come from somwhere, given that neither [pal] nor [back] by itself is sufficient to create one of the five Huave vowels according to the feature set proposed in Chapter 4.

I hypothesize that there is a pressure for epenthetic vowels, which have no inherent features, to acquire their features from pre-existing ones in their phonological environment, rather than adding new features out of the blue. This translates to a DEP constraint, as in (4.19a). According to the vowel feature system proposed in chapter 4 and reproduced in (4.20), for a vowel that must have [pal], it takes fewer features to create *i* than *e*; and for a vowel that must have [back], it takes the fewest features to create *a*. Hence these are the default vowels that occur in the respective contexts.

(4.19) a. DEP: Features in the output must have a correspondent in the input.
b. *CV-Disagree >> MAX >> VowelCopy >> DEP

(4.20) Vowel features (as proposed in §3.4)

i	[pal], [hi]
e	[pal], [hi], [lo]
a	[back], [lo]
o	[back], [hi], [lo], [rd]
u	[back], [hi], [rd]

The constraint ranking in (4.19b) produces the observed data. The reader can verify that the ranking DEP >> VowelCopy would essentially negate the force of VowelCopy. For DEP as well as MAX, I now assess one violation for each feature that is not shared with the preceding consonant.

(4.21) *CV-Disagree >> MAX >> VowelCopy >> DEP

/ot^{pal}-Vs^{bk}/	*CV-Disagree	MAX	VowelCopy	DEP
a. oty-os	*!			****
b. ☞ oty-is		*	*	*
c. oty-es		*	*	**!
d. ity-is		**!*		****

The same analysis gets us much, and possibly all, of the infixation data. The main difference between the suffix and infix harmony data is that in infix harmony, the morpheme-initial consonant preceding the epenthetic vowel lacks any [back] or [pal] feature. Instead, the frontness/backness of the vowel comes from the consonant after it.

Note that *CV-Disagree plays no role here, due to the lack of secondary place specification on the initial consonant of *-rV-*. Like in (4.14), MAX does the work of weeding out candidates (4.22a) and (4.22d), which do not realize the secondary feature of the root-final consonant. DEP then picks the correct default vowel to insert, and candidate (b) wins over (d).

(4.22) Infix harmony

/i-rV-m^{bk}/	*CV-Disagree	MAX	VowelCopy	DEP
a. i-ri-m		*!		**
b. ☞ i-ra-m			*	*
c. a-ra-m		*!*		***
d. i-ru-m			*	**!

As we saw in (4.16), MAX only gets consonantal [back] or [pal] to be realized on a neighboring vowel in cases where the features are not realizable on the consonant.

Therefore MAX cannot force the [pal] feature of an inherently palatal coronal to be realized on an epenthetic vowel. This was fine for the analysis of diphthongization in chapter 4, where it correctly models the inertness of palatal coronals, but does not work for phenomena like suffixal vowel harmony where primary [pal] behaves just like secondary [pal]. The constraint ranking in (4.19b), illustrated with the tableau in (4.23), predicts that a root ending in /-$V_{[bk]}C^{pal}$/ would epenthesize a back vowel upon infixation, contra the general pattern where epenthetic vowels take on the [back] or [pal] feature of the neighboring consonant. According to the general pattern we would expect candidate (4.23a) to win.

(4.23) Hypothetical palatal-final root with infix

/a-rV-t^{pal}/	*CV-Disagree	MAX	VowelCopy	DEP
a. a-ri-ty			*!	*
b. ☞ a-ra-ty				**
c. i-ri-ty		*!*		***
d. a-re-ty			*!	**

However, as pointed out in (4.11), there are no attested roots ending in /-$V_{[bk]}C^{pal}$/ that take the non-productive infix *-rV-*. It is not known whether this is a principled or accidental gap. If there turn out to be such forms and they are in line with candidate (4.23a), we will need a VC constraint to prevent vowel copy, since candidate (4.23b) does not violate any of the constraints currently ranked above VowelCopy. We could posit a constraint along the lines of *VC-Disagree, parallel to *CV-Disagree. This would prevent candidate (4.23b) from winning. If more data come to light and it is the actual winner, on the other hand, the analysis as formulated for suffix harmony will get us infix harmony for free, with no additional constraints needed.

Either way, VC interaction is a characteristic common to both infix harmony and diphthongization (if not in exactly identical form). Although we do not yet know whether VC interaction results from an atomic constraint or is emergent from other, independently motivated constraints, the descriptive similarity is worth pointing out: In both processes, a [back] or [pal] feature from a word-final consonant is realized on the preceding vowel. In diphthongization, there are already features on the vowel that need to be preserved and accommodated, resulting in diphthongization. On the other hand, in infix harmony, the vowel has no features and is not subject to any CV incompatibilities with the consonant that precedes it, so [back] or [pal] from the root-final consonant can take over the entire nucleus.

(4.24) VC interaction in infix harmony and diphthongization

a. Infix harmony i - r V - m → i-r**a**-m
[pal] [bk]

b. Diphthongization m e m → m**ia**m
[pal] [bk]

It is important to work out the relationship between harmony and diphthongization at this point, because it seems that the correct analysis is one in which they happen at different levels of the phonology. Using the analysis as developed so far, the wrong result is obtained for infix harmony if both harmony and diphthongization are evaluated in one fell swoop. As shown in (4.25), the analysis predicts that the root vowel can be copied into a diphthongized nucleus. Candidate (c) realizes the [back] feature of the root-final consonant in the second half of the diphthong, in addition to copying the features of the preceding vowel in the first half. Since it does not violate VowelCopy or any of the constraints ranked above it, it is incorrectly predicted to win.[4]

(4.25) Incorrect outcome: harmony and diphthongization evaluated in parallel

/i-rV-m^{bk}/	*CV-Disagree	Max	VowelCopy	Dep
a. i-ri-m		*!		**
b. ☹ i-ra-m			*!	*
c. 💣 i-rio-m				**

One way of obtaining the correct infix harmony pattern would be to have one cycle on which epenthetic vowel features are determined, at which diphthongization is not an option (e.g. ruled out by some level-specific constraint), followed by another cycle determining the surface realization of the vowel nuclei. This chapter deals only with the first such cycle, whose output would then implicitly be the input to the analysis in Chapter 3, but an exhaustive analysis integrating vowel harmony with diphthongization will be the next step in research on this set of problems.

4.4 Issues for spreading analyses

Vowel harmony and other assimilation processes, long-distance or otherwise, have often been analyzed as autosegmental spreading, so it is necessary to consider whether a spreading analysis is suitable for Huave. If a spreading analysis also works, we might ask why it is necessary to develop the constraint-based analysis. It would be surprising if some version of spreading did not work, given that the mechanism of multiple feature linkage is such an intuitive parallel to the basic idea of assimilation that autosegmental spreading can almost be thought of as a descriptive notation, rather than a theory that makes restrictive predictions. Yet, it turns out that Huave vowel harmony -

[4] It might be possible to invoke the phonotactic dispreference for high front vowels next to rhotics (§2.2.2) to prevent epenthesis of *i*, but the analysis would be specific to this *r*-containing morpheme.

specifically, the “sour grapes” pattern of blocking - cannot be captured by autosegmental spreading without creating questionable innovations within the theory. To the extent that the spreading analyses are unsatisfactory, we have reason to prefer the constraint-based analysis.

The successful cases of vowel copy are easy enough to model. (In this section I will stick to suffix harmony, since that is sufficient to illustrate the issues I wish to discuss.) In suffix harmony, the fact that an epenthetic vowel’s [back] or [pal] feature always comes from the consonant before it means that a [back] or [pal] feature on the consonant should spread to the empty vowel slot, as shown in (4.26). The fact that remaining features come from the preceding vowel requires us to posit spreading of the relevant height and (where applicable) rounding features. Crucially, spreading can take place across the consonant because the consonant does not have any incompatible values for those features.

(4.26) Vowel copy as spreading?

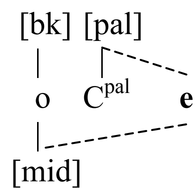
[pal] [pal]

e C^{pal} **e**

[mid]

The problems arise in trying to analyze the cases where vowel copy is not possible and default vowel qualities surface instead. In (4.27), we spread the consonant’s [back] or [pal] feature rightward onto the epenthetic vowel, which produces the desired result. The incorrect predictions are made when we spread features rightward from the preceding vowel. It is straightforward that the spread of the vowel’s [back] or [pal] will be blocked by the [back] or [pal] feature on the consonant, since normally, a feature can only spread through a segment if that segment does not have a specification for the spreading feature. However, since consonants are not specified for height or rounding, spreading predicts that the epenthetic vowel will acquire features from the preceding vowel even when the two vowels have opposite values for frontness or backness. As we have seen from the data in §4.2, this is not what actually happens. In essence, the assumption that spreading is only blocked by incompatible values of the spreading feature predicts "partial class" rather than "sour grapes" behavior.

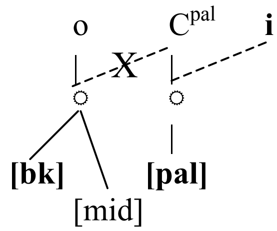
(4.27) Spreading: Incorrect prediction of partial class behavior



← Actual pattern: this spreading is blocked.

The question is whether there is there any way within autosegmental spreading theory to capture the blocking pattern where incompatibility on the front/back dimension blocks spread of all other features as well. One possible analysis way to get vowel features to spread as an all-or-nothing package would be to spread an entire node in the feature tree, containing all the vowel features, and stipulate that features have no ability to spread individually, but only spread along with the dominating node. If for any reason the node could not spread - and blocking by an incompatible value for one of the features under the node would be a reason - then none of its features could be propagated. Under this kind of analysis, schematized in (4.28), we would first attempt to spread all of the vowel features. If whole-node spreading fails, due to a conflicting [back] or [pal] value on the intervening consonant, then the epenthetic vowel can turn to the consonant for its frontness or backness feature, and acquire the rest of its features through default insertion.

(4.28) Node spreading



The node-spreading analysis corresponds to the sour grapes pattern, while individual feature spreading corresponds to partial class behavior. Given that Huave displays sour grapes, and that partial class behavior is known from various phenomena (Halle, Vaux & Wolfe 2000), a conceivable solution would be to adopt node spreading versus individual feature spreading as a language-specific parameter. We would say that Huave spreads nodes, while other languages (e.g. Barra Gaelic; Borgstrøm 1937, Clements 1986, Ní Chiosáin 1995), although they have rules and processes that refer to groups of features, accomplish the actual spreading feature by feature. This issue has not come up previously due to the fact that no cases of sour-grapes blocking have (to my knowledge) been discussed in the literature; Padgett (1995) predicted that sour grapes patterns do not exist.

It is arguably undesirable to make node spreading versus individual ("terminal") feature spreading a language-specific parameter, though, in that this would require an extension to the theory of subsegmental representations: the idea that in some languages (sour grapes), natural classes of features behave in the way predicted by their common schematization in a feature-geometric tree. Namely, they are dependents of a node that is a real phonological entity that spread or fail to spread, taking all its dependent features with it. In other languages (partial class), the feature-geometric tree is merely a convenient visualization: in the actual phonology, nodes are not active entities; they just serve notationally to group together abstract classes of structurally independent features. Since node-spreading and terminal-spreading languages entail such different conceptions of subsegmental structure, the empirical prediction is that sour grapes and partial class phenomena cannot coexist in the same language. While the empirical validity would be the more important parameter in deciding to adopt or reject this theoretical innovation, it is potentially problematic that the proposed innovation would allow languages to differ so fundamentally in their interpretation of such a basic thing as a node in the feature tree.

A different autosegmental-spreading option that could be considered is a parasitic harmony analysis. In parasitic vowel harmony, assimilation of the harmonizing feature only happens in vowels that are already sufficiently similar, i.e. sharing some prerequisite feature. For example, in Yokuts, rounding harmony only applies between vowels of the same height (Newman 1944, Archangeli 1984). In Huave, the analysis would go like this: epenthetic vowels acquire a [back] or [pal] feature from a neighboring consonant. Then, only if it matches the preceding vowel for [back] or [pal] can other features be copied from vowel to vowel. One option is to say that Huave has height harmony that is parasitic on frontness/backness, and other features (rounding) are filled in by default (since Huave has only one vowel for each height and frontness/backness combination). Alternatively, another formulation is that Huave has total copy that is parasitic on frontness/backness.

Either way, this analysis is very similar to the one being proposed. I note that Huave has a somewhat different profile from other kinds of parasitic harmony that have been reported in the literature. Many cases of parasitic harmony are parasitic *on* height:

vowels harmonize for frontness/backness, rounding, or ATR only if they are already the same height (see e.g. Cole & Trigo 1988, Hyman 2002). Although some Turkic languages like Kirghiz have rounding harmony that is parasitic on backness harmony (Steriade 1981), I know of no cases of height harmony that are parasitic on the frontness/backness dimension. Thus even if Huave can be modeled within this approach, it still forms a separate subcategory. Although this is not necessarily reason to abandon the autosegmental parasitic harmony analysis, it is reasonable to ask if there are other ways to relate the Huave pattern to harmony phenomena in general - or if there are alternative ways of analyzing parasitic harmony. I will show in §4.5 that the constraint-based analysis has a natural and previously unexplored way of deriving the difference between the sour grapes pattern and partial class behavior. The type of analysis developed here may be applicable to parasitic harmony in general.

4.5 Correspondence-based analysis

So far, the ranking for the constraint-based analysis looks like this:

(4.29) Constraint ranking developed in §4.3
*CV-Disagree >> MAX >> VowelCopy >> DEP

The purpose of this section is to unpack the informal VowelCopy constraint to bring it into line with other theoretical literature on long-distance interactions in phonology, and to elaborate on conceptual subtleties about the mechanisms of assimilation that risk hiding undistinguished behind such an informal constraint. Here I will present an analysis in terms of string-internal correspondence (Hansson 2001, Rose & Walker 2004). String-internal correspondence (also known as Agreement By Correspondence) is a method for establishing relationships (“correspondences”) between segments in the output, in order to enforce conditions on segments that are in correspondence with each other. It has previously been used for consonant harmony, but the current work extends it to vowel harmony, as part of a larger theoretical research question on to what extent all types of long-distance interactions (or even all interactions between segments) may be unifiable under a single mechanism. The motivation for using the framework here is that this particular theory and the Huave data stand in a mutually beneficial relationship. Huave confirms the existence of sour-grapes blocking patterns in long-distance assimilations, which as Hansson (2007) points out is predicted by the theory but has not been extensively (if at all) documented in real language data. Meanwhile, the formal separation between the conditions holding over corresponding segments and the correspondences themselves, as well as the crucial fact that each of these can be violated to satisfy higher-ranked constraints, provides a clearer and more straightforward way (relative to some alternatives) of modeling the interacting generalizations in Huave vowel harmony.

String-internal correspondence uses two special constraint types, CORR and IDENT. CORR constraints, the template of which is given in (4.30a), specify which segments must formally be in correspondence with each other. However, they do not say anything about the conditions such correspondence could entail. This job is left to IDENT constraints, which require corresponding segments to be identical in a certain feature value or other phonological characteristic; an example requiring that corresponding segments not differ in [nas] is given in (4.30b).[5]

[5] Presumably in the case of long-distance phonological interactions that are not assimilatory, e.g. dissimilation, other constraint types could be used to enforce different types of conditions such as non-identity over corresponding segments.

(4.30) String-internal correspondence: constraint type examples

a. CORR-C↔C: "Let S be an output string of segments and let C_i, C_j be segments that share a specified set of features F. If $C_i, C_j \in S$, then C_i is in a relation with C_j; that is, C_i and C_j are correspondents of one another. (Rose & Walker 2004:491)

b. IDENT-CC(nas): "Let C_i be a segment in the output and C_j be any correspondent of C_i in the output. If C_i is [nas], then C_j is [nas]." (cf. Rose & Walker 2004:499)

CORR constraints come in fixed hierarchies based on similarity and/or proximity. Correspondence is most highly ranked between segments with the greatest similarity, and those that are closest-by to each other. The prediction is that a long-distance assimilation (for example) cannot, all else being equal, fail to affect a pair of segments that are more similar to each other than some other pair of segments that do assimilate. If the ranking of other constraints permits the less-similar pair to be in correspondence, the more-similar pair must be, too. In (4.31a) is a sample constraint hierarchy for stop correspondences. It predicts that for any phenomenon where stops of the same voicing must corrrespond (i.e. CORR-K↔T is satisfied), all pairs of stops that are at least that similar, e.g. stops sharing the same place of articulation, will also correspond.

(4.31) Sample CORR constraint hierarchy (Rose & Walker 2004:491)

CORR-T↔T	>> CORR-T↔D	>> CORR-K↔T	>> CORR-K↔D
'identical stops'	'same place'	'same voicing'	'any oral stops'

For Huave vowel copy, the relevant constraints are the ones in (4.32). CORR-V↔V requires vowels in adjacent syllables to correspond. It is presumably part of a fixed hierarchy where it dominates a constraint CORR-C↔V requiring all segments in a local domain to correspond, but the latter constraint is too low-ranked in Huave to make any effects felt, so it will not be included in the tableaus here. Meanwhile, IDENT-VV requires corresponding vowels to be identical in all features. One violation is assessed for each pair of features that fails to match. This is equivalent to a family of IDENT constraints, with a separate constraint for each feature, ranked without respect to each other and in the same position with respect to other constraints. It is formulated as a single constraint here for expositional clarity, since the choice does not significantly affect the current discussion.

(4.32) Huave vowel copy constraints

a. CORR-V↔V: Vowels in adjacent syllables should correspond.
b. IDENT-VV: Corresponding vowels should have identical featural content. (Assess one violation for each feature.)

The crux of the analysis is the ranking in (4.33), of IDENT-VV over CORR-V↔V. In prose, this means, "It is more important for corresponding vowels to be identical, than it is for them to correspond at all." This is the ranking that produces the sour grapes pattern, because it is better for segments not to correspond at all (violating the lower-ranked constraint) than it is for them to correspond (satisfying the lower-ranked constraint) but not be identical (violating the higher-ranked one). If the segments do not correspond, they are not subject to constraints holding over corresponding segments. In other words, any pair of segments violating CORR-V↔V will vacuously satisfy IDENT-VV, since IDENT-VV only holds over pairs of corresponding segments.

(4.33) Sour grapes ranking

IDENT-VV >> CORR-V↔V

We can see how this works in the tableau in (4.34), where the constraint ranking differs from the one in (4.29) only in that the VowelCopy constraint has been replaced with the two new constraints IDENT-VV and CORR-V↔V.[6] The candidates differ from

[6] It is possible that *CV-Disagree will eventually be converted into string-internal correspondence constraints; this is a topic for future research.

each other in segmental content as well as in correspondence relationships, both of which are evaluated by the constraints. The winning candidate is one in which the vowels are not actually in correspondence. Epenthetic vowel quality is thus determined by other constraints: it is a front vowel due to *CV-Disagree, and it is high rather than mid due to the fact that *i* involves the addition of fewer features than *e*; just as in (4.21), DEP produces the default vowel quality in cases where vowel copy fails. The difference between segmentally identical candidates like (4.34b) and (4.34d) is presumably a psycholinguistic one.

(4.34) Default vowel epenthesis

ot^{pal} + Vs^{bk}	*CV-Disagree	MAX	IDENT-VV	CORR-V↔V	DEP
a. $o_x t^{pal} o_x s$	*!				***
b. $o_x t^{pal} i_x s$		*	*!**		*
c. $o_x t^{pal} e_x s$		*	*!*		**
d. ☞ $ot^{pal} is$		*		*	*
e. $ot^{pal} es$		*		*	**!

In the context where vowel copy is successful, the winning candidate is one in which neighboring vowels are in correspondence as well as being identical. The analysis of the vowel copy situation is illustrated in (4.35). Since there is a candidate (4.35a) which satisfies both of the high-ranking CORR and IDENT constraints, no candidate that violates one of them can win: these include those with corresponding but non-identical vowels (4.35bc), or those with vowels that do not correspond at all (4.35de). The low ranking of DEP ensures that it is better to insert features to satisfy IDENT (4.35a), than to insert fewer features but violate IDENT (4.35b).

(4.35) Vowel copy

et^{pal} + Vs^{bk}	*CV-Disagree	MAX	IDENT-VV	CORR-V↔V	DEP
a. ☞ $e_x t^{pal} e_x s$		*			**
b. $e_x t^{pal} i_x s$		*	*!		*
c. $e_x t^{pal} a_x s$	*!		**		**
d. $et^{pal}is$		*		*!	*
e. $et^{pal}es$		*		*!	**

An elegant consequence of this analysis is that a simple reranking of constraints, CORR-V↔V >> IDENT-VV, gives partial class behavior. This ranking says, "It is more important for vowels to correspond than it is for them to be completely identical." Therefore it is better for vowels to correspond and match in some features, if higher-ranked constraints prevent full copy, than it is for them to do as Huave does and give up on corresponding altogether. This result is illustrated in (4.36); the data are hypothetical to facilitate comparison with Huave, but the pattern itself is the same one found in Barra Gaelic (Borgstrøm 1937, Clements 1986, Ní Chiosáin 1995). The proposed constraints, one CORR and one IDENT, can thus get both the sour grapes and partial class behavior patterns without the need for additional machinery.

(4.36) Reranking: partial class behavior

ot^{pal} + Vs^{bk}	*CV-Disagree	MAX	CORR-V↔V	IDENT-VV	DEP
a. $o_x t^{pal} o_x s$	*!				***
b. $o_x t^{pal} i_x s$		*		***!	*
c. ☞ $o_x t^{pal} e_x s$		*		**	**
d. $ot^{pal}is$		*	*!		*
e. $ot^{pal}es$		*	*!		**

Other implementations of a constraint-based analysis outlined are conceivable, though they would require more formal complications to get both patterns. Such complications may be justified if differences in prediction are found to exist and are empirically borne out, but it is too early to tell. For example, one possibility would be a string-internal correspondence analysis where only vowels of the same frontness or backness are required to correspond. This would essentially be a translation of the parasitic-harmony approach.

Another possibility would be to do away with string-internal correspondence, replacing the CORR and IDENT constraints with an all-or-nothing IDENT or AGREE constraint enforcing featural identity between vowels in adjacent syllables. This IDENT constraint would not be multiply violable; any pair of non-identical vowels, no matter the extent of the (non-) identity, would give a single violation mark. The decision of default vowel, just like in the analysis proposed above, falls to DEP.

(4.37) Analysis with fell-swoop IDENT

$ot^{pal} + Vs^{bk}$	*CV-Disagree	MAX	"Ident"	DEP
a. $ot^{pal}os$	*!			***
b. ☞ $ot^{pal}is$		*	*	*
c. $ot^{pal}es$		*	*	**!

Although such an analysis would work for Huave, partial class behavior would require a multiply or gradiently violable IDENT constraint to get candidate (4.37c) to win over (4.37b) in a language like Barra Gaelic. The difference between the two patterns would thus be baked into two different constraint types, rather than resulting from different configurations (=rankings) of the same basic parameters. This is arguably, though not necessarily, a disadvantage. Perhaps a greater disadvantage is that we would lose the formal separation between the establishment of correspondence relationships, and the constraints on corresponding segments. This formal separation has enabled rigorous analysis of consonant harmony systems, where the conditions under which segments correspond tend to lie along different parameters than the conditions holding over corresponding segments (e.g. "stops must agree in nasality"), and therefore might be seen as a desirable theoretical mechanism. Without this formal separation, the constraints on IDENT or AGREE constraints become less clear, and they risk becoming "cover constraints" in need of further breakdown. To the extent that a single conceptual framework can be successfully applied to both consonant and vowel harmony, it is preferable not to switch frameworks depending on the phenomenon being analyzed, particularly if such a switch entails a potential decline in rigor. Further predictions of string-internal correspondence therefore need to be worked out more thoroughly to see if it in fact is the analysis that gives the greatest insight while also being consistent with language-internal and cross-linguistic facts.

4.6 Further issues in Huave vowel harmony

In this section I will cover additional data on Huave vowel harmony, and point to some possibilities for relating them to the proposed analysis.

4.6.1 Vowel-final bases

One important set of data that has not yet been incorporated is epenthetic vowel quality in vowel-final bases. Much of the analysis as presented so far depends on the effect of the preceding consonant on epenthetic vowel quality, so it is not clear what the prediction is in forms that have no intervening consonant. At first glance, the lack of an intervening consonant might make it seem as though vowel copy should always be successful, since intervening consonants are a major source of violations of constraints more highly ranked than those enforcing vowel copy. Strictly speaking though, the proposed analysis might predict that the epenthetic vowel's [back] or [pal] feature will have to come from the following consonant rather than the preceding one, much as in infix harmony. Neither of these is exactly what we find, however. In (4.38) we see that there is copy for only two vowels, the back non-high vowels *a* and *o*. For the other vowel-final bases, the suffix vowel is *a*. The predominance of *a* raises the question of whether *a*-final bases derive their *a* suffix vowel through copy or simply through default; only the *o*-final bases demonstrate a clear case of vowel copy.

(4.38) Epenthetic vowels after vowel-final bases

Root-final V	Epenthetic V	Example
i	a	a. t-a-mbiy-as /-mbi/ CP-TV-kill-1 'I killed (it)' (3;41)
e	a	b. t-a-ngey-af /-nge/ CP-TV-hear-3PL 'They heard (it)' (3;41)
a	a	c. t-a-j.mba-af /-j.mba/ CP-TV-break-3PL 'They broke (it)' (4;16)
o	o	d. mi-no-oj /no/ POS-husband-3PL 'their husbands' (3;25)
u	a	e. l-a-ndyu-af /-ndyu/ PF-TV-die-3PL 'They have died' (3;41)

There is no indication that the [back] or [pal] features of the suffix vowels come from the following consonant. For a palatal consonantal suffix like the passive -*ch*, we might expect sharing of [pal] with a preceding epenthetic vowel, but this is not what we find. There is one example of a vowel-final root combining with a palatal suffix, shown in (4.39), and its vowel is the same as for the [back]-consonant suffix in (4.38b). I note that these suffixes are inherently as opposed to secondarily palatalized, so realization of [pal] on the vowel would not be necessary to satisfy the pressure for surface realization of features (MAX). Nor has an independent VC-agreement constraint been demonstrated to exist, as discussed in §4.2. It is therefore possible that even under the analysis as presented, these final consonants would not necessarily be predicted to influence epenthetic vowel quality. There are no secondarily palatalized suffixes, so it is not possible to run further tests.

(4.39) Vowel-final base and palatal suffix

a-ng**e**y-**a**ch /-nge/
TV-hear-PASS
'it is heard' (2;119)

There are a number of uncertainties around these data whose resolution would be a prerequisite for fuller analysis. Specifically, it is not clear whether all apparently vowel-final bases are vowel-final. With the roots ending in front vowels *i* and *e*, glides are epenthesized (at least phonetically) prior to the epenthetic vowel.[7] Since these glides do not appear before all suffixes, I argue in Chapter 6 that they are not part of the underlying root, and their insertion is triggered by the vowel hiatus created by Layer 3 and higher suffixes which require their own syllable. It is still possible that the glides could play a role in vowel epenthesis, for example in a derivational analysis where glide insertion took place after creation of the epenthetic vowel slot but before harmony.

As for the *o*-final forms, we saw in §2.4.1 that final *w* vocalizes to *o* upon addition of a consonantal suffix, if the preceding syllable's vowel is *o*. One possibility is that some *o*-final words actually end in *-ow*, with the glide deleted in unsuffixed forms due to the licensing requirement on tautosyllabic [+round] (§6.1.2). There are very few *o*-final words: a handful of nouns (§5.3.1) and only two verb roots (*ndo-* 'to be complete' and *ndro-* 'to fall apart'). The scarcity of *o*-final roots seems not to be accidental, although I have not yet been able to determine its exact diachronic causes.

[7] A marginal possibility, which would not however solve the issue for *i*, is that *e*-final roots actually do display vowel copy and that the following *ya* sequence is a broken *e*. This has not yet been tested.

The behavior of *u*-final roots, on the other hand, has a more obvious, though still speculative, possibility for diachronic explanation. All *u*-final roots in San Francisco del Mar correspond to San Mateo del Mar roots ending in *-eow*. If the San Mateo del Mar dialect is taken as conservative in this regard, there appears to have been a coalescence by which surface -*eow* went to *-u*. Surface -*eow* has a broken vowel, and as such is underlyingly a front vowel plus (plain) labial glide *w* (Noyer 2003). With combinations of a front vowel and plain consonant, *-a* is the expected vowel quality, provided that the glide (for whatever mysterious reason) does not vocalize. The harmony pattern with *u*-final roots might thus be understandable at least historically in terms of a fossilization of the old harmony pattern despite coalescence having produced a different root vowel.

(4.40) San Mateo *-eow* and San Francisco *-u*

a.	SMo. *-ndeow*	~	SF *-ndyu*	'die'
b.	SMo. *-teow*	~	SF *-tyu*	'count; read'
c.	SMo. *-nganeow*	~	SF *-ngañu*	'drink'

It is almost tempting to posit /-iw#/ -> u# as a synchronic phonological rule, since there are no verb roots ending in /-iw/. In verbs, surface -*iow* arises only in derived contexts such with intransitive [+round] or the third-person plural suffix -*f* (in cases where laryngeal dissimilation results in it surfacing as -*w*). Although phonological differences between derived and non-derived contexts have ample precedent in the phonological literature, the problem is that there are both *u*-final and *iow*-final nouns, a couple of which are listed in (4.41). Since it is not normal for a phonological process to apply only to certain parts of speech, a synchronic coalescence rule is dubious (although I do note that the *-u* nouns start with coronals, and the *-iow* nouns do not).

(4.41) Nouns

a. -*iow*: *piow* 'robalo fish', *iow* 'water'
b. -*u*: *lyu* 'maize cooked without lime', *ñu* '(s)he/it'

Lastly, many *a*-final roots come with intransitive aspiration (§6.4.1): -*j.mba* 'break', *j.pa* 'be called', *j.ka* 'be looked for. Another *a*-final root -*sa* 'to tell' has a voiceless fricative as its initial consonant. It might therefore be possible to analyze these roots as underlyingly ending in a *j* which is deleted due to laryngeal dissimilation with the preceding instance of [+spread glottis] (§2.5.1). On the other hand, evidence was discussed in §2.1.3 that such aspirations belong to the vowel and are not consonants; as such they would be unable to bear secondary [back] or [pal] features that would cause them to behave like other root-final consonants for the purposes of vowel harmony.

In short, more research on vowel-final roots is needed before their patterns of vowel harmony can be incorporated into the main analysis, although in any case they promise interesting complications.

4.6.2 Cyclicity issues

Another issue for future research is how to integrate the analyses of diphthongization and vowel harmony to account for the variation in (4.42). The forms on the left have undergone only one diphthongization, and diphthongs only appear (if at all) in the final syllable. Conversely, the forms on the right appear to have undergone diphthongization on multiple morphological cycles, once on a root-final domain, and again (if applicable) upon suffixation, and diphthongs are found in non-final syllables. (See also §2.2.4.)

(4.42) Optional diphthongization non-finally

a.	t-a-lang-ius /-lang^{pal}/ CP-TV-cross-1 'I crossed (it)' (3;89)	b.	t-a-laing-ius CP-TV-cross-1 'I crossed (it)' (3;89)
c.	t-a-lap-ius /-lap^{pal}/ CP-TV-lick-1 'I licked (it)' (3;96)	d.	t-a-laip-ius CP-TV-lick-1 'I licked (it)' (3;96)
e.	t-a-j.mik-af /-j.mik^{bk}/ CP-TV-descend-3PL 'they went down' (3;52)	f.	t-a-miok-af CP-TV-descend-3PL 'they went down' (3;46)

The analyses so far have been formulated to account for the forms on the left. The ones on the right are trickier. We can say that diphthongization is "optionally cyclic" - but since the [back] or [pal] feature on the root-final consonant still makes itself felt for vowel harmony in the next-larger morphological domain, i.e. acts as if it is still there, the feature must still be associated with the consonant in the output of the first cycle. Otherwise, if the consonant is no longer associated with its underlying [back] or [pal] feature, the prediction for epenthetic vowel quality would be incorrect. Although a full and rigorous formulation of these ideas is beyond the scope of the current chapter, this seems to be a promising direction for a solution.

A related question is what happens when a consonant is surrounded on both sides by epenthetic, wholly underspecified vowels for which it is the preferred or only possible source of [back] or [pal] features. This configuration is possible in words with the morphological form in (4.43a), where the root-final consonant is preceded by the infix vowel (which as noted in §4.2.2 cannot get features from the *r*, which is not specified for [back] or [pal]) and followed by an epenthetic suffix vowel (which as illustrated throughout this chapter gets frontness or backness features from the consonant that precedes it).

There is not yet sufficient data to be sure of what happens in this context. Only one token, the one in (4.43b), is attested in my data, but it is extremely interesting because the infix vowel is a copy of the front vowel *i* of the root - despite the fact that the root-final consonant is plain. Compare the non-suffixed form in (4.43c), where we see the default back vowel *a* that is expected in the plain-consonant context. This is the only example so far where the harmonic quality of the epenthetic vowel changes in a different morphological context.

(4.43) Epenthetic vowels on both sides

a. a-CV.rV.C-VC
TV-Root.PASS-SUFFIX

b. k-a-mi.r**i**j.t-aw (pronounced *kamerejtaw* due to Vowel Reduction)
G-TV-bury.PASS-3PL
'they were buried' (2;109)

c. x-i-n-a-mi.r**a**j.t
1-FT-1SB-TV-bury.PASS
'I'll be buried' (2;71)

An analysis is premature since this one token, transcribed from spontaneous speech, has not been verified. Additionally, more forms should be collected in order to discern the pattern. If this pattern turns out to be robust, one direction for an analysis might be to posit that the [back] feature on the root-final *t* is realized ("discharged") onto the following suffix. The consequent lack of need to realize the feature on the preceding vowel (i.e. no MAX violation, since the feature has already been realized) would open the way for lower-ranked vowel copying constraints to take effect, and vowel copy would be successful. The integration of such an analysis with the optional cyclicity problem in the previous subsection would provide a further challenge, since I have suggested there that features stay associated with the consonants until after all cyclic processes have applied, i.e. that "discharge" of the feature happens too late (in derivational terms) to affect most other phonological processes.

4.7 Discussion

The crucial ranking in the proposed string-internal correspondence analysis of sour-grapes patterns in vowel harmony is IDENT >> CORR. Whenever this ranking schema obtains, i.e. whenever CORR is low-ranked, it is more important for a candidate output to satisfy IDENT than to have string-internal correspondence at all. When highly ranked markedness (or other) constraints prevent the satisfaction of Ident, the rescue is simply to not have segments correspond. Although the lack of correspondence will violate CORR, it results in satisfaction of IDENT, since as mentioned the IDENT constraint only holds over segments that are in correspondence. The candidate output is thus free from any of the constraints that apply to corresponding segments.

Although the present study is the first (to my knowledge) to present a real-language case of sour grapes in vowel harmony, and also the first to tie IDENT >> CORR constraint schemata to the autosegmental and feature-geometry literature on "sour grapes" and partial class behavior, the IDENT >> CORR schema itself does have precedent in the phonological literature. I will take this section to mention some of these precedents, in the interest of setting the stage for eventually relating the Huave vowel harmony pattern to other phenomena in phonology and perhaps beyond, where the same cognitive primitives of correspondence relationships and conditions on those corresponding entities appear to apply.

Hansson (2007) points out that the possibility of Markedness >> IDENT >> CORR rankings means that Correspondence theory predicts the existence of blocking in long-distance phonological interactions. This is noteworthy because previously, it was thought that string-internal correspondence could not model any cases of blocking, due to the fact that intervening segments are not considered in the evaluation of any one corresponding segment pair (Hansson 2001, Rose & Walker 2004). On this view, both spreading and correspondence are necessary for the analysis of long-distance interactions: the former for cases where intervening segments are affected or otherwise play a role, and the latter for cases where intervening segments play no role. The observation that blocking effects can not only be modeled in Correspondence theory, but are robustly predicted by it, opens the question of whether all long-distance phonology is modelable as Correspondence, and whether we need spreading at all.

Hansson (2007) constructs a hypothetical case of sibilant harmony where markedness and identity constraints are ranked above Correspondence constraints (Markedness, IDENT >> CORR). In the chain of three sibilants shown in the tableau in (4.44), reproduced from Hansson (2007), the middle one is opaque, blocking the left-to-right spread of sibilant harmony (i.e. identity between sibilants for the feature [±ant]).

(4.44) Blocking under Correspondence (Hansson 2007)

tʃ...z...s	*ʒ	ID[-ant]-CC	CORR-Š↔Z	CORR-Č↔S	CORR-Č↔Z	ID[+ant]-IO
a. $tʃ_i...ʒ_i...ʃ_i$	*!					**
b. $tʃ_i...z_i...ʃ_i$		*!				*
c. $tʃ_i...z_i...s_i$		*!*				
d. $tʃ_i...z_j...ʃ_i$			*!		**	*
e.☞ $tʃ_i...z_j...s_j$				*	**	
f. $tʃ_i...z_j...ʃ_j$				*	**	*!

Since Huave vowel copy (at least in the case of epenthetic suffix vowels) is blocked by intervening consonants, the prediction of this kind of system is borne out. Hansson (2007) also mentions Kinyarwanda (Walker & Mpiranya 2005) as a potential instantiation of the prediction.

Sour grapes (although this label is not used) plus the emergence of the unmarked (TETU; McCarthy & Prince 1994) is attested in another copy process, namely fixed-segment reduplication (Alderete, et al. 1999). The existence of formal parallels across different types of copying suggests that Identity and Correspondence are more general types of abstractions in grammatical structure. Alderete, et al. (1999) discuss Lushootseed diminutive reduplication, some data for which are given in (4.45). In Lushootseed, the reduplicant copies the initial CV of the root. However, for various reasons schwa and long vowels are independently ill-formed in the reduplicant. In these cases, a default vowel is inserted.

(4.45) Lushootseed diminutive reduplication data (Bates 1986, Urbanczyk 1996)

a.	s-duk^w	s-dú-ʔ-duk^w	‘bad’/‘riff-raff’	Copy
b.	təláw’-il	tí-təlaw’-il	‘run’/‘jog’	Default (*ə)
c.	s-du:k^w	s-dí-du:k^w	‘knife’/‘small knife’	Default (*V:)

By ranking an IDENT constraint over the base-reduplicant correspondence constraints, Alderete, et al. (1999) derive the winning candidate, which is (in the authors’ insightful terms) a “non-copy” (4.46a) instead of an “imperfect copy” (4.46b).

(4.46) Lushootseed tableau (Alderete, et al. 1999): IDENT >> FAITH-BR

/s-RED-du:k^w/	IDENT$_{BR}$(m)	MAX-V$_{BR}$	DEP-V$_{BR}$
a. ☞ s-d$_1$í-d$_1$u$_2$:k^w		*(u)	*(i)
b. s-d$_1$ú$_2$-d$_1$u$_2$:k^w	*!		

The Alderete, et al. (1999) paper overlaps with a small literature specific to vowel copy that addresses the question of whether the mechanisms underlying vowel copy are best modeled with feature spreading, or with base-reduplicant correspondence. The intuitions behind the correspondence referred to in this literature are similar to the ones employed here, though string-internal correspondence enables us to relate vowel copy most closely to other harmony processes than to reduplication, which seems a welcome result. Yu (2005) and Inkelas (2008) discuss several cases of vowel copy in terms of base-reduplicant correspondence, whereas Kawahara's (2007) work on "echo epenthesis" (i.e. vowel copy epenthesis) argues in favor of a spreading account.

Kawahara's four main arguments in favor of vowel copy as spreading rather than correspondence appear to be undermined by consideration of further cross-linguistic data. (I will omit detail on exactly how the arguments would support spreading over correspondence; these can be found in the original paper.) The first is that vowel copy is only found with vowels, never with consonants; this is falsified by counterexamples in Yu (2005). The second is that vowel copy never targets vowels as a distance, i.e. it never skips vowels; one counterexample is San Mateo del Mar Huave (Noyer 2003), where vowel copy skips metrically weak syllables.

The third argument is that vowel copy only copies segmental material, never prosodic characteristics such as length. Since length is generally not modelable as a feature that can spread, the possibility for copying of length is an important difference in prediction between spreading and correspondence. Kitto and de Lacy (1999), in a paper on vowel copy, cite an example from Selayarese (Mithun & Basri 1985), where moraic structure is copied, as evidence for a correspondence account of vowel copy.

The fourth argument is that long-distance phonology that is due to correspondence is generally not blocked by intervening segments, whereas vowel copy is often blocked. This argument is undermined by the present case of vowel copy in San Francisco del Mar Huave, which can be blocked by intervening segments but where a correspondence analysis appears to be superior to a spreading one. Kawahara (2007) cites numerous other cases of vowel copy being blocked by intervening segments, which will need to be examined in future research to determine the extent to which a correspondence analysis is suitable for them.

4.8 Summary

To summarize this chapter, Huave is a new contribution to the typology of vowel harmony in general and vowel harmony in particular. It is a rare example of a "sour grapes" pattern of blocking, and as such provides a unique opportunity to distinguish the predictions of spreading versus correspondence analyses. Comparing the two types of analyses, I have claimed that a string-internal correspondence approach along the lines of Hansson (2001) and Rose & Walker (2004) can get the sour grapes pattern as well as the cross-linguistically also-attested partial class behavior pattern, but that the Huave data are problematic for spreading analyses.

Huave thus lends support for string-internal correspondence analyses of long-distance assimilation. Hansson's (2007) predictions of blocking under correspondence are confirmed, and the theory is applied successfully outside of consonant harmony; the result is that the present analysis draws together and highlights connections between two different bodies of phonological literature: that on vowel harmony and long-distance phonology, which is traditionally heavy on feature geometry and representations; and correspondence, which until Hansson (2001) focused largely on reduplication. The analysis of Huave, in turn, begins to raise the larger question of whether all long-distance interactions may be reconceptualized as correspondence - and to what extent spreading is still a necessary or desirable formal mechanism.

Chapter 5

Morphological Overview

Huave has four morphosyntactic word classes: verbs, adjectives, nouns, and function words. The word classes differ along parameters such as syntactic distribution, possibilities for inflectional and derivational affixation, and, to a marginal extent, internal root structure. In this chapter I will highlight the major morphological characteristics of each word class. Woven into this will be discussion of overlap between classes, specifically points where the various criteria do not converge on identical category divisions. Since most of the morphological action in Huave is in the verb, the next chapter (Chapter 6) will be devoted to a detailed overview of verbal morphology, while morphological topics for other word classes will be covered in the relevant subsections of this chapter.

5.1 Verbs

Huave verb roots are bound, so all verbs are made up of a root plus one or more affixes. Huave has a variety of prefixes and suffixes, as well as "mobile affixes" - which are affixes that surface sometimes in prefixal and sometimes in suffixal position, depending on conditions detailed in Chapter 7. A couple of the prefixes and suffixes are analyzable as floating autosegments rather than as segmental, linearly concatenated morphemes (§6.1.2, §6.4.1), and there is also one unproductive infix (§6.4.3.1).

The majority of verb roots are monosyllabic (CVC, CV, or VC). Some examples of common CVC roots are listed in (5.1); they all have one phoneme each in the onset, nucleus, and coda, although some contain digraphically represented consonants or diphthongized/aspirated vowels (see chapter 3). Examples of CV and VC roots, covering most of those known to me, are given in (5.2) and (5.3). There are also a few roots consisting of a single consonant (C), and a modest number of disyllables; lists of all such roots in my database thus far (reduplicated and infixed forms aside) are given in (5.4) and (5.5), respectively. Some disyllabic roots appear to come historically from compounds of Verb + Object, although incorporation is not (at least currently) an active process in the language.

The next-largest domain after the root is the stem, which I define as the root plus any morphology required for further affixation. Most roots (transitives, some intransitives) form stems with the addition of a prefixal theme vowel *a-* or *u-*. I will call these "prefixing" roots. On the other hand, a subset of intransitive roots do not take a prefixal theme vowel, and form their stem either with a suffixal vowel or without adding phonological material at all; I will call these "suffixing" roots. Even when there is no suffixal vowel, the innermost affix (in terms of the Layer model presented below, and more fully motivated in Chapter 7) is invariably a suffix.

The terms "prefixing" and "suffixing" therefore refer to the location of the hierarchically innermost affix (theme vowel or suffixal vowel/other suffix), although further affixation beyond that can take the form of either prefixes or suffixes. I have chosen these terms to leave open the question of whether post-root vowels in suffixing roots are instances of the same morpheme as prefixal theme vowels. While some evidence points to them not being morphologically identical (see §6.1.2), I consider the question unresolved, and do not wish to use terminology such as "athematic" (for suffixing roots) that would lock in a particular analysis.

Further detail on the structure and semantics of prefixing and suffixing verb roots will be given in Chapter 6; for now it suffices to note the existence of the two categories. Prefixing verb roots will be cited with a dash preceding the root, while suffixing verb roots will be cited with a dash following. Some roots can be either transitive and prefixing or intransitive and suffixing, forming transitivity alternations through the prefixing/suffixing parameter rather than with addition of morphemes; such roots are cited with dashes both preceding and following.

(5.1) Examples of CVC verb roots with different nucleus types

a. Monophthongs: -*rang* 'do, make', -*jaw* 'see, know', -*tsamb* 'bite', -*kaly* 'wait, stay', -*kwik* 'laugh', -*peñ* 'press', -*ndok* 'fish', -*mong* 'pass by', -*mbul* 'help'

b. Aspirated: -*yajk* 'feel, think, know' -*xijp* 'bathe', -*kojch* 'cut', -*lyejk*- 'open', -*ñujty* 'steal'

c. Diphthongized: -*jior* 'have', -*ndiak* 'speak, say', -*naijp* 'sell'

(5.2) CV verb roots

a. With front vowels: -*mbi* 'kill', -*ki* 'stay, linger', -*nge* 'hear', -*me* 'sleep', -*pe* 'arrive', -*tye* 'hang, spread out', *le*- 'be complete'

b. With back vowels: -*sa* 'tell', -*rra*- 'be bright, clear', -*la* 'eat' (pejor.), *ndo*- 'be complete', *ndro*- 'fall apart', -*ndyu* 'die', -*tyu* 'count; read, study'

(5.3) VC verb roots

a. With front vowels: -*ix* 'nauseous', -*iond* 'tolerate', -*eñ* 'accompany (foods)'

b. With back vowels: -*ay* 'weave', -*ajch* 'chop (wood)', -*ol* 'stir', -*oly* 'tie', -*ojty* 'dig', -*uñ* 'buy', -*uy*- 'circle', -*ujp* 'smoke'

(5.4) C verb roots

a. Plain: -*w* 'go out, exit', -*mb* 'go', *p*- 'stagnate (of water)'

b. Palatalized: -*ty* 'eat', -*wy* 'borrow', -*my* 'dream', -*mby* 'be all gone', -*jch* 'give'

(5.5) Disyllabic verb roots

a. With identical front vowels: -*chilip*- 'pour', -*mingily* 'hem; roll up (sleeve)', -*xindity* 'massage', *chepely*- 'get scraped (skin)'

b. With identical back vowels: *sarrand*- 'slip', -*sandat* 'dump (liquids)' -*jalak* 'thunder', -*sapaw* 'yawn', -*sambap* 'touch', -*walas* 'shuck (corn)' (cf. *as* 'elote'), -*jongoy*- 'boil', -*sokol* 'put folded item in dish', -*xujku(ñ)* 'put out (fire)', -*nchukuy* 'tickle' (cf. -*nchuy* 'wrinkle, dim.')

c. With different vowels: -*kapiw* 'wither in sun', -*ngañu* 'drink' (cf. -*ngan* 'sweet', -*ngañ* 'get drunk'; *iow* 'water')

Verbs are inflected for person and number to agree with the subject (and rarely, the object as well; see §6.1.3). Huave distinguishes four person categories (first person, second person, third person, and first-person inclusive) and two number categories (singular and plural). In all person categories aside from the first-person inclusive, the plural straightforwardly entails the addition of one or more third-person participants. First person plural therefore refers to the speaker plus one or more third persons, i.e. it is a first-person exclusive.

In their grammar of the San Mateo del Mar dialect, Stairs and Hollenbach (1981:295) use the more general terms *mínimo* "minimal" and *múltiple* "augmented" instead of "singular" and "plural," because the first-person inclusive by definition entails at least two participants and cannot really have a "singular" form. The minimal of the first-person inclusive refers to two participants, while the multiple refers to three or more. However, in the San Francisco del Mar dialect this distinction is largely eroded, and speakers use the two forms of the first-person inclusive more or less interchangeably. The minimal is far more common, and multiple forms are attested only very sparsely. Speakers also combine the historically minimal first-inclusive pronoun with the historically multiple verb form, or the historically multiple first-inclusive pronoun with a first-*exclusive* verb form, etc. Thus while first-person inclusive forms will be referred to in terms of their historical categories (minimal and multiple), the reader should bear in mind that there is variation in their usage.

Inflectional paradigms will be given in tables of the format in (5.6), with singular/minimal forms on the left and plural/multiple forms on the right. I will reserve the terms "minimal" and "multiple" for the first-person inclusive only, because all forms referring to more than one person (1^{st}, 2^{nd}, 3^{rd} plural and *both* first-person inclusives) have common structural characteristics setting them apart from the 1^{st}, 2^{nd} and 3^{rd} singular. Thus "singular" and "plural" are still useful concepts, with both of the first-person inclusive categories falling into "plural" category.

(5.6) Paradigm schema

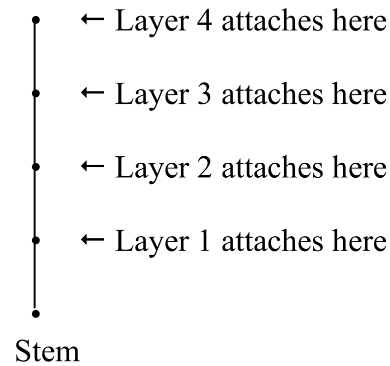
1^{st} singular	1^{st} plural (exclusive)
2^{nd} singular	2^{nd} plural
3^{rd} singular	3^{rd} plural
1^{st}-inclusive "minimal"	1^{st} -inclusive "multiple"

Huave verbs inflect for one of seven tense/aspect categories: atemporal, completive, stative, future, perfect, progressive, and durative. These are described in further detail in §6.3. Additionally, the various uses of nonfinite-like verb forms which I call the "subordinate" (following Stairs and Hollenbach's terminology) and the "gerunds" are discussed in §6.2.

Prefixes, suffixes, and mobile affixes can be divided into four layers according to their relative distance from the verb stem. The overall structure of the verb has morphemes in hierarchical layers expanding symmetrically outward from the stem, as illustrated in (5.7); I call these Layer 1, Layer 2, Layer 3, and Layer 4, and abbreviate L1, L2, etc. An alternative visualization is the tree in (5.8), which emphasizes hierarchical constituency without specifying the direction of node branching. Affix order will be treated in more depth in Chapter 7.

(5.7) [L4 [L3 [L2 [L1 [Stem] L1] L2] L3] L4]

(5.8)



A list of the affixes in each layer is given in (5.9). Note that Layers 1 and 3 consist nearly exclusively of mobile affixes. Non-mobile prefixes and suffixes occurring between L1 and L3 are assigned to Layer 2; similarly, prefixes and suffixes occurring outside L3 are assigned to Layer 4.

(5.9) Layer membership of affixes

Layer 1 prefix: 2^{nd} person *i-*/*e-*
Layer 1 suffix: Intransitive [+round]
Layer 1 mobile affixes: Completive *t*, 1^{st}-person Subordinate *n*, Subordinate *m*, Stative *n*, 2^{nd}-person Intransitive *r*
Layer 2 prefix: Future *i-*
Layer 2 suffix: Reflexive *-e*
Layer 3 mobile affix: 1^{st} person *s*
Layer 4 prefix: Progressive *ndyu-*
Layer 4 suffixes: 3^{rd} Plural *-f*; Plural *-n*, 1^{st}-person Inclusive *-r*/*-(j)ts*

This list focuses on affixes external to the stem, and does not include a few stem-internal morphemes which occur inside Layer 1. Obligatory stem-internal morphemes are theme vowels (for prefixing verbs), post-root vowels (for suffixing verbs), and (in some prefixing, intransitive verbs) a lexically specified theme-vowel aspiration *j*. Also not on the list are two nonproductive derivational morphemes, the causative suffix *-(j)ch* and passivizing infix *-rV-*, which occur inside Layer 1.

I have also excluded affixes that are not known to cooccur with other affixes, since their hierarchical status cannot be determined if their position relative to other affixes cannot be assessed. These are gerundive *k-*, passivizing *-ch*, and passive *-rV-n*, the last of which appears to be a fossilized collocation of the plural suffix and nonproductive passivizing infix. The just-mentioned affixes, along with those in the list in (5.9), are an exhaustive list of the verbal affixes which I have so far been able to identify based on my fieldwork.

Several of the verbal morphemes have allomorphs due to regular phonological processes as discussed in more detail in Chapter 2. Here, I will simply note the contexts in which they occur and their effect on the surface shapes of the morphemes. Transcriptions will reflect the phonological processes, except (to be consistent with the orthography) in the case of automatic palatalization before *i*.

Palatalization of coronal consonants (except rhotics) before front and high vowels affects the first-person mobile affix *s*, which palatalizes to *x* before the future prefix *i-*, the only context in which it directly precedes a front or high vowel. (There is no palatalization before instances of *u* that come about through phonotactically-driven epenthesis and vowel harmony, even though coronals otherwise palatalize before *u*.)

Palatalization before front and high vowels also affects the completive *t-* and stative *n-*, which palatalize to *ty-* and *ñ-* (respectively) before the second-person *i-/e-*, the valence-reducing theme vowel *u-*, and the reflexive suffix *-e*.

The third-person plural suffix *-f* has four allomorphs (*-f*, *-j*, *-w*, *-Ø*) due to the complex (but transparent) interaction of laryngeal and labial dissimilation. The bilabial voiceless fricative *f* is a fused segment consisting of aspiration (*j*) plus *w*, so under certain phonological conditions one or both of these components can be deleted. See §2.4.3 and §2.5 for illustrations.

Word-finally, the intransitive [+round] suffix manifests itself either as *-w* or not at all depending on whether or not the conditions for labial dissimilation (§2.4.3) apply. Word-medially, it surfaces as *-u* or *-o* depending on vowel harmony (§2.4.3).

Vowel breaking causes the second-person prefixes *i-* and *e-* to diphthongize to *io-* and *ia-*, respectively, before word-final consonants that are non-palatal (§2.2.3). The relevant configuration can arise with single-consonant roots and with the second-person intransitive *r*.

There is one case of a morphologically governed alternation, between *i-* and *e-* for the second-person prefix in Layer 1. Essentially, *e-* occurs in the presence of another Layer 1 prefix, and *i-* shows up elsewhere; see §6.1.2 for more detail.

The presence or absence of aspiration in the causative suffix *-ch*/*-jch* appears to be lexically idiosyncratic and specified on a root-by-root basis. In the first-person inclusive suffix *-ts*/*-jts*, there is variability in whether aspiration occurs. Even in the absence of aspiration there is not necessarily any significant compensatory lengthening of the preceding vowel. Due to the rarity of these forms, which are disappearing from the language, the nature of the variation is unknown. I cite forms as transcribed in my fieldnotes and from my field recordings rather than standardizing them, in order to avoid obscuring any potential patterns that might later be discovered.

5.2 Adjectives

Huave has diverse morphological categories of roots and words that serve in attributive or predicate-adjective-like function. Some have morphosyntactic properties of verbs; others most closely resembles nouns; and still others are distinct from both. I will briefly survey these, and outline issues in (though not resolve) the problem of whether Huave can be said to have a distinct word class of "adjectives," and which of the word types in this section might be considered for inclusion in it.

Many concepts that are adjectives in Spanish or English are expressed with the morphological form of stative verbs in Huave (similar to the above-mentioned nouns with stative-verb morphological structure). Many such statives derive transparently from inchoative verb roots, which are often attested only sparsely in non-stative tenses/aspects as compared with the adjective-like stative forms. Statives from inchoatives take the theme vowel *a*-.

(5.10) Stative *n*- + Theme vowel *a*- + Inchoative root

	Adjective	Gloss	Inchoative Root
a.	n-a-ðam	'big'	-ðam 'get big'
b.	n-a-kants	'red'	-kants 'redden'
c.	n-a-kats	'wet'	-kats 'get wet'
d.	n-a-wajk	'dry'	-wajk 'get dry'
e.	n-a-lyeng	'true; yes'	-lyeng 'straighten'
f.	n-a-nay	'dirty'	-nay 'get dirty'
g.	n-a-xip	'thick, fat'	-xip 'fatten, swell'
h.	n-a-tang	'grown up'	-tang 'grow'

(5.11) Attributive uses of statives

a. Dya-jionts a <u>n-a-waj up</u>
PROG-cry D ST-TV-dry leaf
'The dry leaves are making noise.' (2;106)

b. <u>N-a-lyuy piats</u> s-a-lyup tiol a najngoy
ST-TV-soften tortilla 1-TV-soak in D caldo
'The soft tortillas, I soak in the soup.' (2;95)

(5.12) Attestations of inchoative meaning

a.

Mbat	t-a-ðam	xuwe.
louse	CP-TV-get.big	much

‘The louse got really big.’ (1;145)

b.

Aj	ka	jely	ka	ñ-u-tye	dy-a-waj
D	D	clothes	this	ST-TV-hang	PROG-TV-get.dry

‘These clothes are hanging, they’re drying.’ (2;109)

In a very productive morphological construction, statives of transitive verbs take the theme vowel *u*-, and translate to English/Spanish participles.

(5.13) Attributive uses of *u*-theme statives of transitive verbs

a.

S-a-ndiom	ñ-u-pants	katy
1-TV-want	ST-TV-fry	fish

‘I like/want fried fish.’

b.

ñ-u-wij	us
ST-TV-thresh	maize
‘threshed maize’	(2;18)

Although the “adjective” examples so far might be argued to be nothing more or less than statives, i.e. verb forms, there are some complications with such a claim. First, there are a number of commonly used adjective-like words with stative morphology, but whose roots are not attested in my data in other tenses/aspects (5.14). This could be for semantic/pragmatic reasons relating to the viability of inchoative meanings for some of the roots, or a matter of accidental gaps, but it seems safe to say that the stative/inchoative alternations are less robust for these than for the roots in (5.10).

(5.14) Other na(j)- adjectives

naxix ‘tasty (salty)’, *nangan* ‘sweet’, *namonts* ‘acidic’, *nangajk* ‘bitter’, *najtix* ‘salty’, *nawety* ‘fragrant’, *najmbok* ‘stinky’, *nangaj* ‘sacred’, *namix* ‘small’, *narix* ‘small, thin’, *nalyu* ‘young, tender’, *nasañ* ‘young’, *nauly* ‘difficult’, *napaty* ‘hard’

Secondly, similar to the nouns in (5.34), there are also adjectives built with a theme vowel *i-* which is not used in the verbal system. Note that (5.15c) shows person-marking on a word that was listed above in (5.34) as a noun referring to a person. Here the line between noun and adjective is problematic; the word appears to have both uses. (The morpheme breakdown necessitates the glossing of *-laj(k)* as 'ear', although *ñilaj(k)* is lexicalized with the meaning 'deaf'.)

(5.15) a. ñ-i-anch 'lazy'
b. ñ-i-nchew 'stupid'
c. Iok ñ-i-r-i-laj.
you ST-2-2I-TV-ear
'you (sg.) are deaf' (2;142)

Third, although stative forms do inflect for person and number (see the paradigms in §6.3.7), there are attestations of utterances where they do not. These mostly involve stative forms being used in adverbial function; the obligatoriness of person/number agreement in other functions is a topic for future investigation, and anecdotal memory leads me to suspect that there will be wide obsolescence-related variation on this point.

(5.16) a. I-ndiak napak pa m-a-nge ñu a nax.
2-speak strong so SB-TV-hear she D girl
'Speak loudly so the girl will hear you.' (2;93)

b. Ngo m-e-yajk napaty-e?
not SB-2-feel ugly.RF
'Don't you feel sick/bad?' (2;153)

Perhaps most notably, however, there is arguably an independently motivated category of adjectives, namely a small set of non-bound roots with adjectival semantics. All of these are disyllabic. Whereas other words with modifying function are derived from roots that are basically inchoative, these roots are basically adjectival, and corresponding inchoatives are derived through adding verbal morphology. The examples in (5.18) show examples of adjectival uses of the bare roots, and (5.19) shows that when adjectival roots are used as suffixing verb roots in the atemporal paradigm (§6.1.2), there is still an adjectival meaning. The exact semantic differences between the forms in (5.18) and (5.19) is not known. It is not known whether these roots can occur in overtly stative-marked forms.

(5.17) Disyllabic adjectival roots (non-exhaustive list)

tsapaj 'thick', *tongoy* 'bent', *sonong* 'piled up', *tarrap* (dim. *tirip*) 'wide', *kayang* 'hard, stale', *ngarrats* 'old', *ntsokoy* 'wrinkled'

The examples in (5.18ab) are predicating uses of adjectival roots; the syntax of an NP with attributive adjective would be to have a determiner preceding the adjective + noun, similar to (5.18d). The example in (5.18c) with possessive morphology is syntactically ambiguous between a predicating and attributive use, although in the particular instance attested here it was being used predicatively.

(5.18) Adjectival (predicating and attributive) uses of bare roots

a. Tsontsok a jely
wrinkled D clothes
'The clothes are wrinkled.' (2;33)

b. Tongoy a kandyely.
bent D candle
'The candle is bent.' (2;12)

c. Tsapaj xi-wix.
thick 1POS1-hand
'My arm is thick.' (2;45)

d. anots tongoy xiol
one bent stick
'a bent stick' (3;29)

(5.19) Verbally inflected uses

a. Aj ka jely ke xuwe ntsontsok-o-Ø.
D D clothes that very wrinkled-V-3PL
'That clothing is very wrinkled.' (3;66)

b. Tarrap-a-w tiot a najta.
wide-V-ITR down D woman
'Está aplastada en el suelo (la mujer)' (refers to spreading out of women's skirts on the ground when they are selling in the market) (2;117)

Inchoatives are created by using the adjectival root as a suffixing verb root (5.20), while causative transitives are created by using the adjectival root as a prefixing verb root (5.21).

(5.20) Tense/aspect-marked inchoative uses

a. La tsapaj-a-w
PF thick-V-ITR
'It is now thick.' (2;13)

b. La tongoy-o a kandyely.
PF bent-V D candle
'The candle has become bent.' (2;13)

c. Tsontsok-o-t i-mbas
wrinkled-V-CP 2-front
'Frunces la frente.' (lit. "your forehead wrinkled.") (2;33)

d. Sonong-o-t a polvo.
pile.up-V-CP D dust
'The dust piled up.' (2;18)

e. Tsapaj-a-m
thick-V-SB
'(so that) it will thicken' (2;21)

(5.21) Transitive uses with prefixing stem

a. I-tongoy i-lyej para chut-u-m-ia-r.
2-bent 2POS1-foot to sit-V-SB-2-2I
'You bend your legs to sit' (sitting on the ground with legs crossed) (2;72)

b. I-xuñung a biom i i-jch m-a-ndajp.
2-pile.up D hearth and 2-give SB-TV-burn(itr.)
'Pile up the firewood and make a fire.' (3;66)

There are some words in my data that are relevant to the discussion on disyllabic adjectives, although they do not fit as neatly into the category as the examples discussed so far. For example, the word *damas* ‘thick (dense)’ is a non-bound root that is used in phrases like *damas oik* ‘thick cloud’ (3;35), although I do not know whether inchoative, verbal uses are possible. Similarly, I do not have *jayats* ‘new’ or *mbuwiol* ‘yellow’ attested in inchoative or other uses with verbal morphology.

The noun *ndorrok* ‘ditch has a related word *(n)dorrop-o-n* ‘low, deep’, which would look to be straightforwardly stative-suffixed but for the replacement of root-final *k* with *p*. The speaker vetoed my suggestion of **ndorrokon*. The word *ndokop* ‘hole, dent in the ground’ (1;118) is also related to these. The segments *k* and *p* alternate in semantically related pairs of words elsewhere in the language as well, such as in the roots *-rrejk* and *-rrejp* which both mean ‘touch’, though the origin and properties of the alternation are mysterious.

(5.22) a. Aj ka ndorrok ke p-a-t iow
D D ditch that stagnate-V-CP water
‘Water collected in the ditch.’(3;89)

b. K-al.anek lugar ngo me mas dorrop-o-n.
G-another place not P very low,deep-V-ST
‘Another place is not very low (so water didn’t collect there).’ (3;89)

The root *torrots* is attested both as a standalone word, and as a verb with a reflexive suffix.

(5.23) a. Aj kuchu ñunch ke a-torrots-e an.
D small boy that TV-limp-RF just
‘That little boy is limping.’ (3;100)

b. Torrots i-lyej
cojo 2-foot
‘You limp.’ (2;117)

Lastly, there are some disyllabic noun and verb roots in my data for which the Stairs & Stairs (1981) dictionary of the San Mateo del Mar dialect suggests connections to the adjectival-root phenomenon. I have the word *tolonts* 'blister' attested in the sentence in (5.24a), where it is not clearly categorizable, though perhaps nominal. But the San Mateo cognate in (5.24b) is more directly analogous to the examples in (5.20). Further fieldwork should help clarify which types of derived and inflected forms are available to each root in the various dialects, and which of these differences are real differences as opposed to accidental gaps in the data.

(5.24) a. A-wit-ich   tolonts xi-wix
TV-raise-CAUS   blister 1POS-hand
'[That wood] raises blisters on my hand.'   (2;69)

b. Tolonts-o-t   xi-leaj.
blister-V-CP   1POS-foot
'My foot blistered.'   (Stairs and Stairs 1981:172)

Yet another class of adjective-like words are words that have the morphology of Class 2 possessed nouns, but are translated as predicate adjectives, with the morphological possessor as the subject. The few words in this category that I know of I mostly refer to negative personal qualities. In (5.25) are some examples of usage. Note the perfect-aspect morphology in (5.25c). The perfect *la* is usually followed by the particle *me* when combined with nouns, so although the exact properties of nominal predication are not yet well understood, the absence of *me* in this context should be noted at least in passing. A better understanding of the syntactic behavior of these words will be required for a full analysis.

(5.25) Predicating adjectives with possessed-noun structure

a. Xu mi-rrujch.
very POS-stingy
'You/(s)he are/is very stingy.'

b. Xiok xa-anch.
I 1POS-lazy
'I'm lazy.'

c. La xa-kich.
PF 1POS-thin
'I am now thin.' (2;149)

d. Xiok i xa-chijk-iow xuwe xa-rramb-ey-an.
I and 1POS-young.sib-3PL very 1POS-greedy-RF-PL
'I and my younger siblings are very greedy.' (elicited) (2;140)

A full paradigm for predicating possessed nouns is shown in (5.26). This particular example has a reflexive suffix *-e*, with epenthesis of the palatal glide *y* upon addition of vowel-initial suffixes (§2.4.2).

(5.26) Person- and number-marking paradigm of predicating possessed nouns (2;140)

xa-rramb-e 1POS-greedy-RF 'I am greedy'	xa-rramb-ey-an 1POS-greedy-RF-PL 'we (ex.) are greedy'
mi-rramb-e POS-greedy-RF 'you (sg.) are greedy'	mi-rramb-ey-an POS-greedy-RF-PL 'you (pl.) are greedy'
mi-rramb-e POS-greedy-RF 's/he is greedy'	mi-rramb-ey-af POS-greedy-RF-3PL 'they are greedy'
mi-rrambey-ar POS-greedy-RF-INC 'we (incl.) are greedy'	mi-rramb-ey-ajts POS-greedy-RF-INC 'we (incl.) are greedy'

I have one root that is attested in a variety of structures (5.27), with little apparent difference in meaning. The structure in (5.27c) is mysterious; it is identical neither to the possessed-noun predicate adjectives, nor to the normal pattern of person-marking on statives as shown in §6.3.7.

(5.27) a. Xa-nchew
1POS-stupid
'I am being stupid.' (2;149)

b. Xiok ñ-i-nchew-ias.
I ST-TV-stupid-1
'I am being stupid.' (2;149)

c. Xiok s-a-yaj xi-ñ-i-nchew.
I 1-TV-feel 1-ST-TV-stupid
'I feel I am being stupid.' (2;149)

5.3 Nouns

5.3.1 Noun structure

The only fully productive inflection that appears on Huave nouns is possessive marking. A noun belongs to one of three classes (which I will call Classes 1, 2 and 3), based on the pattern of possessive marking that it takes. Class 1 and Class 2 are closed classes consisting of bound roots that obligatorily take possessive markers. Class 3 is the open, productive class encompassing the majority of nouns in the language. Class 3 nouns are free and can occur as bare roots; this includes Class 3 body parts, for example, despite the fact that Class 1 and 2 body parts are bound. Bound noun roots are written with a preceding dash (-), and unless otherwise indicated belong to Class 1.

Nouns are marked for the person and number of the possessor. The person and number categories used are the same as those for verbs: first (exclusive), second, third, and first-inclusive person, and singular and plural number, again with the exception that the first-inclusive distinction between speaker/hearer only and speaker/hearer plus other participants has been largely eroded, if it still exists at all. Possessive marking is discussed in further detail in §5.3.2.

In terms of internal morphological structure, there are three main categories of nouns: monomorphemes, nouns with deverbal morphology (not necessarily related to a synchronically attested verb root), and compounds.

To start with the first of these categories, most monomorphemic noun roots consist of a single syllable. Possible shapes include CV, VC, and CVC. There are no noun roots consisting of a single segment. CV roots are noticeably underrepresented; the list in (5.28b) includes all monosyllabic nouns in my database that do not end in a consonant or *j* (since it is not clear how to tell the difference between word-final vowel aspiration and word-final consonantal *j*).

(5.28) Monosyllabic Nouns

CVC Nouns	CV Nouns	VC Nouns
lol 'well' xex 'bowl' joy 'hammock' max 'canoe' lam 'river' kang 'rock' wiujt 'sand' ndyuik 'ocean, sea' xiol 'tree, wood' piats 'tortilla', katy 'fish' ñity 'palm tree/leaf' kius 'dog' tiok 'hill'	pi 'chicken' -mbe 'mouth' mbe 'mazorca' so 'pig' no 'husband' to 'penis'	ix 'iguana' ijk 'toasted corn' ijty 'human feces' iñ 'gulabere (plant)' iot 'land, earth' iom 'house' iow 'water' ion '(north) wind' eñ 'mangle blanco (tree)' ex 'tacazonte (fish)' as 'elote' ap 'woman's father/mother-in-law' orr 'shell' oik 'cloud' onts 'garza (bird)' us 'maize' up 'leaf' um 'egg' unts 'string; secretion'

There are also disyllabic and longer noun roots that do not have obvious internal morphological constituency (i.e. appear to be monomorphemic), although it is likely that at least in some cases there is internal structure that has been obscured over the course of language change. Many of these are animal and plant names. Some of these may be loans. The list excludes reduplicated nouns.

(5.29) Disyllabic Nouns

a. Animals: *tixum* 'shrimp', *tsapajch* 'lion', *xukwaf* 'deer', *chijling* 'sierra (fish)', *chiyam* 'toad', *ngumaj* 'alacrán', *pujkur* 'armadillo', *pujtang* 'guela lizard'

b. Plants/Plant-related: *matsajt* 'pineapple', *chipiñ* 'tomato', *lakuj* 'guayaba', *sambam* 'calabaza', *titiom* 'beans' (possibly reduplicated)

c. Other: *tomion* 'money', *chikot* 'mud', *jaranch* 'thread, string', *lotoj* 'hole', *manchiok* 'iron; jail', *tsajkats* 'sky', *wijchior* 'rain', *ajtsa* 'masa (corn dough)'

(5.30) Trisyllabic Nouns

incharek 'southern wind', *sanapay* 'coyote'

In the category of disyllables, there are also several Class 3 roots starting in *u*-, which also happens to be the 3rd-person possessive prefix for Classes 1 and 5. It is possible that these are former Class 1 or 2 nouns where the possessive prefix fossilized as part of the root, especially given the virtual absence of other vowel-initial disyllabic noun roots, and the fact that several of these are body-part and kinship words. Synchronically, however, these take the Class 3 possessive morphology on top of the fossilized prefixes.

(5.31) *u*-initial Nouns

ulaim 'wing', *undiats* '(human) hair', *ukwats* 'mother/father-in-law, *uñijk* 'meat', *ulam* 'sugar cane', *ukas* 'star', *ungwiujts* 'night'

The second large group of nouns, all belonging to Class 3, consists of those with (de)verbal morphology, most commonly the affix *n*. Where this *n*- is a prefix, it is followed by a theme vowel *a*-, *u*-, or *i*- (the last of which is found only in nouns and no longer exists as a verbal theme vowel in San Francisco del Mar, but is still marginally present in verbs in the dialect of San Mateo). The *a*- vowel is sometimes aspirated: *aj*-, while the others are not attested with aspiration. Most nouns formed with the *i-* vowel are either instrumentals (5.34a) or refer to various disabilities (5.34b).

It is debatable whether this nominalizing *n* should be considered an instance of the affix *n* which functions in the verbal system as a stative marker. In (5.32)-(5.35) I have listed nouns whose meanings are not predictable from the semantics of the base roots, even though it is true that some nouns are more semantically transparent than others. In many cases, though, the apparent morphological root does not even correspond to a verb root that is synchronically attested in the language. Nouns with frozen deverbal morphology will therefore not be cited with morpheme breaks, even when they can be decomposed structurally into recognizable constituents. On the other hand, productive nominalizations (for example, referential instances of stative verb forms) will be cited with morpheme breaks. (I note that the distinction between lexicalized and productively formed words of this type is not unproblematic.)

(5.32) Nouns in na-

a. na- with corresponding verb
najmbiol 'horse cart' (-mbiol 'roll')
naw X 'person from place X' (-w 'exit')

b. na- with corresponding noun
naxiol 'milpa' (xiol 'tree, wood, stick, forest')

c. na- without corresponding other root
najngoy 'food', najndye 'trash', nalily 'sweat', natikiom 'avocado'

(5.33) Nouns in ñu-

a. ñu- with corresponding verb
ñurrar 'heat' (-rrar 'heat sthg. up'), ñukoy 'pain' (-koy 'hurt, itr.')

b. ñu- with corresponding noun
ñulajk 'donkey' (-lajk 'ear'), ñumbiom (nangaj kaf/naty) 'eclipse ([of the] holy moon/sun)' (-mbiom 'home'; refers to the moon/sun being inside its home)

c. ñu- without corresponding other root
ñunch 'boy', ñutiol 'tamal'

d. ñu- "doer of X" (productive)
ñukejch 'teacher' (-kejch 'teach') (2;16)
ñunaijp 'vendor' (-naijp 'sell') (2;93)
ñurang max 'canoe-maker' (-rang 'make', max 'canoe') (3;69)
ñurang najngoy 'cook' (najngoy 'food')
ñurang saj(k) 'doctor' (sajk 'medicine, remedy')

e. Productive nominalization of entire verb phrase
ñ-u-pojch-e i-mal
ST-TV-cover-RF 2POS1-head
'something to cover your head with' (1;121)

(5.34) Nouns in ñi-

a. ñi- with corresponding verb (Instrumentals)
ñijim 'broom' (-jimb 'sweep'), ñijoñch 'comb' (-joñch 'comb'), ñindal 'molinillo' (-ndal 'batir; picar')

b. ñi- with/without corresponding noun (Infirmities)
ñitoty 'crippled person' (toty 'buttocks'), ñilajk 'deaf person' (-lajk 'ear'), ñikek 'person with harelip', ñisom 'nearly blind person', ñichiok 'blind person'

c. ñi- without corresponding other root
ñipinaj 'person, people', ñikikiriu 'small pieces' (partially reduplicated form; note that *kiriu* is also used by itself to mean 'small pieces')

(5.35) Nouns with suffix -n and corresponding verb

a. rran 'light; electricity' (-rra- 'be bright, clear')
b. mbayan 'espanto' (mbay- 'be scared')

Another subcategory of nouns with identifiable, if not synchronically transparent, internal morphological structure are those beginning with *k-*. The function of the productive morpheme *k-* in the verbal system is not entirely clear, but it appears to create a kind of gerundive form (see §6.2.2) and is related at least diachronically to these nouns. Again, these particular examples can be considered lexicalized insofar as they have idiosyncratic meaning (compare *najmbiol* 'cart' in (5.32) with *kajmbiol* 'wasp' in (5.36)) or are built on a root that is not otherwise attested.

Initial *k* in these nouns (as far as I know) is always followed by *a-*, with the possible exception of *kiriu* 'small pieces; small quantity'. The only example of *ku-* + Root that I know of is an adjective, *ku-chujch* 'small'. I know of no nouns ending in this *k*, which is perhaps expectable given that *k-* in the verbal system only appears as a prefix (as opposed to the stative *n*, which is mobile).

(5.36) Nouns in *ka-*

katsoj 'toy' (cf. *-tsoj* 'play'), *kajmbiol* 'wasp' (*-j.mbiol* 'roll'), *kambaj* 'village, city', (possibly related to *mbaj* 'flower'), *kaung* 'fruit'

A few special cases bear mention here. First, the plural prefix *mu-* (§5.3.3) has fossilized on a couple of words without necessarily having plural meaning: *mu-na-ngich* 'youth' (related to root *kich* 'thin'), which can be used as a singular or as a plural; and *mu-na-xing* 'shame (*vergüenza*)'. Also, there are two roots that appear to have fossilized completive morphology: *taxuy* 'old (of men and things)' and *tajta* 'old (of women)'. These straddle part-of-speech boundaries, as shown in their various uses in (5.37), but in any case they are transparently related to the nouns *naxuy* 'man' and *najta* 'woman', as well as isolated uses of the bare roots as in *xuy pi* 'rooster', lit. 'man-chicken'. Note that *taxuy* tends to be reduced to *taxu* in common collocations.

(5.37) Nominal uses of taxuy, tajta

a. taxu xa-tyety 'my grandfather' (lit. 'old my-father')
b. tajta xa-mam 'my grandmother' (lit. 'old my-mother')

Adjectival use

c. na-taxu(y) kambaj 'Pueblo Viejo'

Verbally inflected uses

d. la-s-a-taxuy 'I am now old.' (men)
PF-1-TV-old(m.)
e. la-s-a-tajta 'I am now old.' (women)
PF-1-TV-old(f.)

Finally, Huave has compounds, although there are relatively few in my database; the vast majority of nouns are either monomorphemes or built on single roots. The line between single-word compounds and conventionalized multi-word expressions is fuzzy; features such as one stressable syllable only, phonological reductions, and semantic opacity are present to varying degrees and create a continuum between single- and multi-wordhood. Because of this, and also since conventionalized Noun + Noun and Adjective + Noun collocations are relatively common, I will include some examples of all of these.

In Noun + Noun compounds, the first noun is the head noun, and the second is the modifier. Note that several of the compounds contain bound (Class 1 & 2) nouns which cannot otherwise occur without inflectional morphology.

(5.38) Compounds

a. kalwix 'ring' < kwal 'son/daughter' + -wix 'hand'
b. kambajiot 'world' < kambaj 'village, city' + iot 'land'
c. rranchex 'colander' (for making atole) < rrants 'colador' + xex 'bowl'
d. rranchur 'colander' < rrants 'colador' + xur 'pot' (2;120)
e. untsakax 'cow dung' < unts 'secretion' + wakax 'cow'
f. maliow'wave' < -mal 'head' + iow 'water' (2;106)
g. malion 'stomach' < -mal 'head' + ion 'air'

Many of these compounds are not typically possessed, but one area for future research is the location of possessive morphology with respect to the individual constituents of the compound. To take the example in (5.38g), the way to say 'my stomach' is *mal-xa-ion*, literally 'head of my air', rather than **xa-malion* 'my air-head'. The location of possession is probably influenced by the semantics of the compound, but it is also possible that it would differ systematically according to a morphological distinction between single and multiple words.

In general in Huave, modifying nouns can be postposed to head nouns to productively form NPs. A representative set of examples is given in (5.39).

(5.39) Head Noun + Modifier Noun NPs

ñutiol pi 'chicken tamal', ñutiol katy 'fish tamal', ñutiol tixum 'shrimp tamal', ñutiol ix 'iguana tamal', ñutiol wakax 'beef tamal'

Another common NP construction uses the possessive prefix *mi-* in the configuration *mi*-X Y, which translates to "X of Y." Possession of the referent of the entire compound is marked on the second noun.

(5.40) Possessive NPs

a. mi-mam xi-wix 'my thumb' < mam 'mother' + xi-wix 'my-hand'
b. mi-tyuñ kaway 'pachito' < tyuñ 'plum' + kaway 'horse'

In (5.41) are examples of exocentric Verb + Noun compounds.

(5.41) Exocentric compounds

paliom 'door' < -pal- 'close' + iom 'house' (2;76)
najmbok ijty (tree species) < n-a-jmbok 'stinky', ijty 'human feces'

As for compounds and collocations involving a noun modified by an adjective, the constituent order is Adjective + Noun for native Huave modifiers (5.42), but Noun + Adjective for modifiers loaned from Spanish (5.43).

(5.42) Adjective + Noun in native Huave

a. nataxu(y) kambaj 'Pueblo Viejo' < nataxuy 'old' + kambaj 'town'
b. jayats kambaj 'Pueblo Nuevo' < jayats 'new' + kambaj 'town'

(5.43) Noun + Adjective with Spanish loans

a. kants istian 'garlic' < kants 'chile', *cristiano (referring to Europeans?)
b. piats kastil 'bread' < piats 'tortilla', kastil 'Spanish'

Lastly, I will discuss some instances of greater complexity. The javelina can be called by either of the two names in (5.44ab). The first of these is straightforwardly of the compound type illustrated in (5.40), translating to 'pig of the *monte*'. The second has the Noun + Noun structure of the examples in (5.39), but with the noun prefix *na-* additionally preposed (cf. (5.32)). Similarly, (5.44c) appears to be made up of two content words plus a preposed nominalizer. The structure seems to be an anomalous N + V, but further analysis would require a better understanding of the constituents and/or the discovery of similar compounds. Lastly, (5.44d) is a complex compound of *mal* 'head' + *kiriow* 'donde corre el agua', the second of which is itself a compound.

(5.44) Compounds: other

a. mi-so-piat 'javelína' < so 'pig' + piat 'monte'
b. na-so-piat 'javelína' < so 'pig' + piat 'monte'
c. ñ-untsakak 'spindle (malacate)' < unts 'string'; cf. SMo. -tsakak 'spin'
d. malk(w)iriow 'riverhead' < -mal 'head', -k(w)ior 'run', iow 'water'

5.3.2 Possessive classes

As noted above, nouns can be divided into three classes depending on which of three possessive-marking paradigms they participate in. Classes 1 and 2 are closed classes, while the majority of nouns belong to Class 3, which is the only productive possessive-marking pattern. NP word order is Possessive-marked Noun + Possessor.

Class 1 noun roots are bound, almost never (if ever) occurring without a possessive marker. They might be considered inalienably possessed, although it is only a subset of e.g. body parts that fall into Class 1. A list of most (if not all) Class 1 nouns in my data so far is in (5.45).

(5.45) Class 1 nouns

a. Body parts: *-xing* 'nose', *-ñujk* 'eye', *-lajk* 'ear', *-mbe* 'mouth', *-laik* 'tooth/teeth', *-ñiw* 'tongue', *-mal* 'head', *-ñok* 'neck (front)', *-wix* 'hand/arm', *-lyej* 'foot/leg', *-puch* 'back'

b. Other: *-mbas* 'exterior, front', *-miajts* 'insides, heart', *-mbiom* 'home, hearth', *-sajp* 'seed (of a plant)' (2;111), *-pang* 'shell (seed, fruit, turtle)' (2;28, 2;56, 2;91), *-mbety* 'price'

The inflectional paradigm for Class 1 nouns is given in (5.46). As far as the affixes, the sibilant in the first person and high front vowel in the second person are recognizable from the verbal inflectional system, and the plural suffixes are identical. Of note is the citation form of Class 1 nouns. It uses the prefix *u-*, which might be considered unmarked for person since it is found in both the third and first-inclusive persons; and the suffix *-n*, which also might be considered a default among the plural suffixes since it occurs in both the first and second persons.

(5.46) Class 1 inflectional paradigm: u-lyej-an, 'foot, leg' (1;173)

xi-lyej 1POS1-foot	xi-lyej-an 1POS1-foot-PL
i-lyej 2POS1-foot	i-lyej-an 2POS1-foot-PL
u-lyej POS1-foot	u-lyej-aw POS1-foot-3PL
u-lyej-ar POS1-foot-INC	u-lyej-ats POS1-foot-INC

Class 2 is very small. A list of all known Class 2 nouns is in (5.47), and the inflectional paradigm is shown in (5.48). It is very similar to the Class 1 paradigm, except in the first person, where the possessive prefix vowel is *a* instead of *i*, and the preceding sibilant is consequently plai n *s* rather than palatalized *x*.

(5.47) Class 2 nouns

a. Body part: -*taing* 'belly' (3;26)
b. People: -*puy* 'daughter-in-law' (2;25), -*xiw* 'brother-in-law' (1;61), -*kiuj* 'friend' (1;113, 1;115, 1;121)
c. Personal object: -*ndyujk* 'necklace' (3;26)

(5.48) Class 2 inflectional paradigm: -*puy* 'daughter-in-law' (3;25)

sa-puy 1POS2-nuera	sa-puy-ion 1POS2-nuera-PL
i-puy 2POS2-nuera	i-puy-ion 2POS2-nuera-PL
u-puy POS2-nuera	u-puy-iuf* POS2-nuera-3PL
u-puy-ior POS2-nuera-INC	

Lastly, Class 3 is the open, productive class containing (to my knowledge) all nouns not listed under Classes 1 and 5. The inflectional paradigm is given in (5.49), split between two different nouns for convenience of citation (since the full paradigm has never been elicited at one time).

(5.49) Class 3: *pek* 'shoulder' (1;172), *kius* 'dog' (1;173), *kwal* (2;133)

xa-kius 1POS-dog	xa-kius-an 1POS-dog-PL
mi-pek POS-shoulder	mi-pek-ian POS-shoulder-PL
mi-pek POS-shoulder	mi-pek-iaf POS-shoulder-3PL
mi-pek-iar POS-shoulder-INC	mi-kwal-ajts POS-child-INC

Note the homophony between the second and third person singular forms. When the referent of the anaphoric *mi-* is not clear from discourse context, it can be disambiguated witha full NP consisting of Noun + Possessor. In fact, such NPs are valid with all possessed nouns, even when the possessive morphology is unambiguous.

(5.50) Possessive NPs

a. mi-pek ñu
POS-shoulder s/he
'his/her shoulder' (1;172)

b. xi-lyej-an xinan
1POS1-foot-PL we.EX
'our (excl.) feet' (1;173)

c. u-wix-iow ñuaf
POS1-hand-3PL they
'their hands' (1;173)

d. mi-pek-ian inan
POS-shoulder-PL you.PL
'your (pl.) shoulders' (1;172)

A noteworthy subset of Class 3 nouns are disyllabic roots of the shape uCVC. Although these are robust in taking the Class 3 possessive affixes, the initial *u-* may be a historical Class 1 or 2 prefix that has fossilized onto the root. This hypothesis is supported by the fact that the two such nouns found so far are body parts. A similar class of nouns exists in the San Mateo del Mar dialect (Stairs and Hollenbach 1981:347-8). Interestingly, at least one noun that belongs to this subclass in San Mateo del Mar is a Class 1 noun in the San Francisco del Mar dialect: *u-ñiw* 'tongue' (1;84). Both of the nouns in (5.51) also belong to Class 3 in San Mateo del Mar.

(5.51) Fossilized uCVC nouns in Class 3

a. xa-undiats 'my hair'
b. mi-undiats 'his/her/its hair' (2;7)
c. Aj ka pi a-mem mi-ulaim pero ngo ndo-m m-a-j.laly.
D D chicken TV-flap POS-wing but not can-SB SB-TV-fly
'The chicken flaps its wings but can't fly.' (1;156)

A list of Class 3 body parts is given in (5.52) to show that noun class membership is not necessarily predictable based on semantic field, although many of the most important body part words seem to be in Class 1. Class 3 body parts can occur without possessive morphology; the citation form is the bare root.

(5.52) Class 3 body parts (2;7-8)

toty 'waist', *mboy* 'cheek', *jiu* 'breast', *tong* 'belly button', *pek* 'shoulder', *ngwax* 'elbow', *nchety* 'shin', *kos* 'knee'

Possessives of already-possessed NPs are found in the names of many body parts, for example (5.53ab). With some constructions of this type, the first noun does not have possessive marking (5.53cd). The differences between these two constructions remain to be investigated. Sonnenschein (2005) discusses similar variation in the structure of possessive marking in a Zapotec language.

(5.53) Complex body part names

a. mi-mam xi-wix
POS-mother 1POS1-hand
'my thumb' (lit. 'mother of my hand')

b. u-puch xi-wix
POS1-back 1POS1-hand
'the back of my hand'

c. mal xa-ion
head 1POS-air
'my lungs' (2;7)

d. pal xi-mbe
close 1POS1-mouth
'my lips' (2;7)

There is an analytic possessive construction that can be used with Class 3 nouns in lieu of the normal Class 3 morphology. It uses a pronoun built on the root *-kwej* 'thing', which as can be seen in (5.54) takes Class 1 inflectional morphology.[1] Some

[1] The root *-kwej* only occurs in special constructions like the possessive pronoun, the negative *ñi-kwej* 'nothing', and the reduplicated expression *kwej.kwej an* 'anything at all'. The main Huave word for 'thing' is the Spanish loan *cosa*.

illustrations of NPs using -*kwej* are given in (5.55); note that the head nouns, although they belong to Class 3, do not take any inflection. Note also the predicating uses of the possessive pronoun in (5.55cd).

(5.54) Possessive pronoun -*kwej*, Class 1 (1;173)

xi-kwej 1POS1-thing	xi-kwej-an 1POS1-thing-PL
i-kwej 2POS1-thing-PL	i-kwej-an* 2POS1-thing-PL
u-kwej POS1-thing	u-kwej-aw* 1POS1-thing-3PL
u-kwej-ar 1POS1-thing-INC	u-kwej-ats 1POS1-thing-INC

(5.55) Uses of -*kwej*

a.	ventan	u-kwej	a	iom		
	window	POS1-thing	D	house		
	‘window of the house’			(2;76)		
b.	pek	u-kwej-ats				
	shoulder	POS1-thing-INC				
	‘our (incl.) shoulders’ (1;172)					
c.	Xi-kwej-an	aj	ka	kius	ke.	
	1POS1-thing-PL	D	D	dog	D	
	‘That dog is ours (excl.).’ (1;173)					
d.	Aj	ka	iom	ka	u-kwej-ar	
	D	D	house	D	POS1-thing-INC	
	‘This house is ours (incl.).’				(1;173)	

There seem to be a few instances of third-person possessive marking with *ka-* with some Class 2 and 3 nouns. (This is another example of the many poorly understood alternations between *mi* and *ka* in the language.) The form in (5.56d) could conceivably be a gerund rather than a possessive, though *up* ‘leaf’ is attested independently as a noun and not as a verb.

(5.56) ka- possessives?

a. ka-tañ ñu
POS2-belly s/he
'his/her belly' (3;26)

b. A-long-iuf anots lyai(w) wax ka-tang-iuf para ngo
TV-hang-3PL one key on POS2-belly-3PL for not

m-a-w a ñañ ñi.kek.
SB-TV-exit D baby harelip
'They (pregnant women) hang a key from their bellies (waists) so that the baby doesn't come out with a harelip.' (2;30)

c. ka-ndyujk
POS2-necklace
'his/her necklace' (2;154)

d. ndy-a-j.lich ka-up a xiol
PROG-TV-fall POS-leaf D tree
'The tree leaves are falling.' (2;66)

5.3.3 Plural marking

Plural number is generally not marked on nouns. The major exceptions are words for people that begin with *na-* or *ñu-*, which can take a plural prefix *mu-*. This includes deverbal words for people that are productively formed with *ñu-* + Verb Root (5.33) (or in at least one case *na-* + Verb Root), some examples of which are in (5.57b).

(5.57) *mu-* plurals

a. Lexicalized words for people: *mu-nax* 'girls', *mu-ñunch* 'boys', *mu-naxuy* 'men', *mu-najta* 'women'

b. Productive deverbalizations: *mu-ñu-ndok* 'fishermen' (*-ndok* 'fish'), *mu-ñu-tsañ* 'musicians' (*-tsandy* 'hit'), *mu-na-tsoj* 'negritos' (mischievous men in traditional festivals, with faces painted black; *-tsoj* 'play'), *mu-ñu-naijp* 'vendors' (*-naijp* 'sell', 2;98), *mu-ñu-rang saj* 'doctors' (*-rang* 'make', *saj(k)* 'medicine', 2;91)

Aside from the *mu-* plurals, it seems (strangely enough) that the regular plural suffixes can be added to possessed nouns to mark plurality, even though they cannot be added to unpossessed nouns. In (5.58ab), the word for 'younger sibling' has first-person possessive marking, in addition to the third-person plural suffix (which cannot be construed with the first-person possessor).

(5.58) Plural marking in possessives

a. Xiok i xa-chijk-iow xuwe xa-rramb-ey-an.
I and 1POS-young.sib-3PL much 1POS-greedy-RF-PL
'My younger siblings and I are very greedy.' (2;140)

b. Xa-chijk-iow ñuaf.
1POS-young.sib-3PL they
'They are my younger siblings.' (2;140)

c. Xa-chijk-ion ñuaf.
1POS-young.sib-PL they
'They are our (excl.) younger siblings.' (2;140)

One possibility is that plural suffixes could be ambiguous in some contexts as to whether they refer to the plurality of the possessor or possessed. I have tried to elicit examples where both possessor and possessed are plural, but have not been able to get more than one plural marker on the same word in any of the combinations of persons I have tried. An interesting question is whether there is complete optionality in which plural marker is chosen, or whether the choice is rule-governed. In (5.58c), for instance, only the plural suffix agreeing with the possessor is made overt, and not the plurality of the head noun itself. This may be due to the fact that the plurality of the head noun is already obvious from the plural pronoun in the sentence context.

5.3.4 Genitive case?

Although the San Francisco del Mar dialect of Huave can generally be said to lack a case system, there are a few verbs whose personal-pronoun objects take the form of the genitive pronoun in (5.59), rather than the regular personal pronouns.

(5.59) Genitive case

a. I-xot-e xi-kwej
2-hide-RF 1POS1-PRON
'You hide yourself from me' (2;1)

b. Xiok s-al=n-a-me a-paj xi-kwej xa-najta
I 1-DUR=1SB-TV-sleep TV-call 1POS1-PRON 1POS-woman
'(while) I was sleeping, my wife calls me' (2;10)

c. A=m-e-jach[2] xi-kwej
DUR=SB-2-owe 1POS1-PRON
'You (sg.) owe me.' (2;34)

d. I-tijp xi-kwej i ndo xa[3]-n-a-tijp i-kwej
2-show 1POS1-PRON and then 1-FT-1SB-TV-show 2POS1-PRON
'Show me, and then I'll show you.' (2;145)

e. Xuwe k-a-rrar xi-kwej.
much G-TV-heat 1POS1-PRON
'I feel very hot.' (2;149)

5.4 Function and closed-class words

A full treatment of all function words is beyond the scope of this chapter. Rather, this section will discuss the structure of morphologically complex function words. Other categories of function words will be mentioned in passing as a barebones reference to help the reader understand them where they occur in example sentences, but detailed coverage must be postponed for future work.

5.4.1 Pronouns

The personal pronouns are given in (5.60). Of note is the fact that they are morphologically decomposable into base elements plus person/number affixes that are similar or identical to ones found elsewhere in the language: sibilant *x* for first person, a

[2] This appears to be another irregular durative of the type discussed in §6.3.8.
[3] It is not uncommon for first-person future forms to start with *xa-* rather than the expected *xi-*. This may be some kind of regressive assimilation from the theme vowel *a-*, since it never happens in the presence of the theme vowel *u-*, but the correct analysis is still uncertain.

high front vowel *i* for second person, and the various plural suffixes associated with different persons, including the first-person inclusive. The first and second person singular are built on a base element *k*, while the third person is built on *ñu* and the remaining personal pronouns are built on *n*. There is potentially a diachronic link to the fact that *k* and *n* are also the segments found in nominalizing morphemes.

(5.60) Personal pronouns

xio-k (xik) 'I'	xi-n-an 'we (excl.)'
io-k (ik) 'you (sg.)'	i-n-an 'you (pl.)'
ñu 's/he, it'	ñu-af 'they'
ku-n-ar 'we (incl.)'	ku-n-ajts 'we (incl.)'

Aside from the easily identifiable first-inclusive suffixes, the internal constituency of the first-person inclusive pronouns is not entirely clear. It may turn out that there is a link to the sequence *kon* which is found in the San Mateo first-exclusive and second person plural pronouns *xikon* and *ikon* (here cited in the object case). Alternatively, there could also be a link to the interrogative *ko-nol* 'why?', given that -*nol* is independently attested as a root meaning 'to have a problem or issue'. (*Ko-* and *ku-* do not necessarily differ phonologically; it is impossible to determine whether they contain *o* or *u* since vowel reduction merges high and mid vowels in nonfinal syllables, so the spellings in these cases are approximations of the pronunciations that in my experience have been most common; see §2.3.3.)

The third person pronouns can refer to animals and inanimate objects in addition to people. The first- and second-person singular pronouns show the effect of vowel breaking, where underlying *i* diphthongizes to *io* in closed stressed syllables. However, they sometimes occur as unstressed enclitics on a main verb, and in these cases do not diphthongize; the enclitic forms are given in parentheses.

In addition to the personal pronouns, numerals and the quantity words *miaw* 'all', *xuwe* 'many' also form pronouns of sorts by taking person and number marking. Attestations of person/number marking on numerals is shown in (5.61). The morpheme breakdown is not entirely clear; the *-e* suffix in the singular forms could be related to the homophonous reflexive. The final *-n* could be related to the *n* in the plural personal pronouns in (5.60), functioning as a pronoun formative, although this is uncertain.

Note that the second-person prefix causes the initial *a-* of the numbers not to appear. I hesitate to gloss the initial *a-* as a "theme vowel," although an analogous alternation is present in verbs. The parallel should be mentioned especially since there is at least one other context where the initial *a-* of numerals does not appear (5.84).

(5.61) Person and number marking on numerals (2;62)

1 (a-nop)	2 (a-jpaw)	3 (a-rujpaw)
s-anop-e-n an 1-one-?-? just 'I alone'	s-ajpau-n 1-two-? 'we two'	s-arujpau-n 1-three-? 'we three'
i-nop-e-n an 2-one-?-? just 'you alone'	i-jpau-n 2-two-? 'you two' (1;123)	
anop-e-n an one-?-? just 's/he alone' (3;27)		

The table in (5.61) is not complete. It would be surprising if the second-person form of the numeral 'three' were not an accidental gap, due to the existence of second-person forms for 'one' and 'two', but I do not know whether the third-person forms exist. I also do not know whether there are first-inclusive forms of numerals. In any case, these words, and particularly the forms based on the numeral for 'one', are often used with the particle *an* 'just' postposed to give meanings like 'us two alone' or 'just you alone'.

Some examples of person-marked numerals in sentence context are shown in (5.62). They can be used either with (5.62a) or without (5.62b) overt pronouns.

(5.62) Usage of person-marked numerals

a. S-arujpau-n xinan x-i-n-amb-an.
1-three-? we 1-FT-1SB-go-PL
'Three of us will go.' (2;62)

b. Ngo n-a-m s-anop-e-n an
not 1SB-TV-go 1-one-?-? just
'I won't go alone.' (2;62)

The paradigms for *miaw* 'all' and *xuwe* 'many' are shown in (5.63). Perhaps the most interesting thing about these forms is the fact that the second-person affix *r*, normally reserved for intransitive verb forms, shows up here in the absence of the (redundant) general second-person prefix *i-/e-* which it never occurs without elsewhere. The reason for this is not known. It is possible that the second-person form of *xuwe* 'many' does contain the second-person *i-/e-* in the form of a suffixal glide *y*, whose only possible phonotactic motivation would be syncopation of an epenthetic vowel. The second-person form is also attested with a vocalized version of this glide (as in the example sentence in (5.64e), and no version of this glide at all. Further research is required, e.g. on the question of whether such a glide ever occurs in the first-exclusive form, which would point to the syncopation analysis. The fact that the glide is a suffix whereas the second-person morpheme is nearly always a prefix might support the same conclusion; nevertheless, all possibilities should be taken into account.

(5.63) Person and number marking on ‘all’ and ‘many’ (1;164, 2;55, 2;62, 3;32)

	1 (excl.)	2	3	1 (incl.)	1 (incl.)
miaw ‘all’	miaw-s-un	miaw-r-un	miau-j	miau-r	miau-s
xuwe ‘many’	xuwe-s-an	xuwe(y)-r-an	xuwey-af	xuwey-ar	xuwey-ats

Phonologically, there is some variation in the surface forms of *miaw* due to the optionality of breaking of underlying *e* to *ia*, and the optional vocalization of the glide *w* in the 1st (excl.) and 2nd person forms; vocalization is obligatory in the other forms, where there is no following syllable into which to resyllabify the post-*w* consonant. For the forms of *xuwe* ‘many’, there are epenthetic glides between the final vowel of the root and the vowel of the suffix. A further point of note is that the second category of first-person inclusives, the historically multiple ones, shows variation between -*ts* and the lenited -*s*, to not even mention the -*jts* endings that show up in this category elsewhere. The forms here are the ones I have attested, but further research could reveal either variation in each form, or (more interestingly perhaps) lack thereof.

A syntactic point to note is that the *miaw* ‘all’ forms is that they are nearly always (if not always) followed by the particle *an* ‘just’, probably to emphasize the exhaustive reference of the pronoun to the entire group of people under discussion. This is seen in the following example sentences.

(5.64) Usages of inflected quantity words

a. Xinan t-a-mb-as-an miau-s-un an n-a-jau-n kuñ dy-a-j.laik.
we.ex CP-TV-go-1-PL all-1-PL just 1SB-TV-see-PL what PROG-TV-exist
‘We (excl.) went all of us to see what was happening.’ (3;32)

b. Miaw-r-un an inan t-e-mb-an a ten an?
all-2I-PL just you.pl CP-2-go-PL also
‘Did all of you go too?’ (3;32)

c. Miau-s an dyu-m-a-ngey-ar lo.ke ndy-a-j.laik
all-INC just PROG-SB-TV-hear-INC what PROG-TV-exist

‘All of us (incl.) are listening to what’s happening.’ (3;32)

d. Xinan t-a-mb-as-an a toy an pero ngo me xuwe-s-an.
we.ex CP-TV-go-1-PL also but not P many-1-PL
‘We went also but we weren’t many.’ (3;32)

e. Inan ngo me xuwe-i-r-an a toy an.
you.pl not P many-2?-2I-PL also
‘You (pl.) were not many either.’

There are signs that inflection on quantity words is not completely robust. One fluent speaker uttered the sentence in (5.65a), which marks plural number but not first person on *xuwe*. Also, when a speaker who readily gave all the forms in (5.63) was asked for words to mean ‘few of us’, ‘few of you’, etc., he gave the series of sentences in (5.65b-d), which seem to indicate that *tyukay* ‘few’ does not participate as readily as the other quantity words do in this construction.

(5.65) a. Xuwey-an xinan x-i-n-a-mb-an.
many-PL we.ex 1-FT-1SB-TV-go-PL
‘Many of us will go.’ (2;62)

b. Xinan tyukay i inan tyukay a toy an.
we.ex few and you.pl few also
‘We (excl.) are few and you (pl.) are few too.’ (3;33)

c. Xinan tyukay-is-an.
we.ex few-1-PL
‘We are few.’ (3;33)

d. Ñuaf tyukay a toy an.
they few also
‘They are also few.’ (3;33)

5.4.2 Articles and demonstratives

I will give a brief overview of Huave articles and demonstratives, to assist the reader in recognizing some of the types of noun phrases scattered throughout example sentences in this thesis. Any real understanding of definiteness or other basic syntactic/discourse properties of these words awaits future research.

There is an article *a*, preposed to nouns, which might tentatively be called a definite article. It is used principally with backgrounded or given information, and rarely (if ever) found sentence-initially. It can also be used with personal pronouns.

(5.66) a. Chup-io-t a xur de iow.
fill-V-CP D pot of water
'The pot filled with water.' (2;2)

b. A-nchiol a us par m-a-rang piats.
TV-grind D maíz to SB-TV-make tortilla
'(She) grinds (the) maize to make tortillas.'

Another article, *aj*, is used in conjunction with combinations of various particles to form demonstratives. For example, the phrase *aj ki* functions as a demonstrative pronoun meaning 'this'.

(5.67) a. Aj ki pand-io-w wax an.
D D rot-V-ITR right.away
'This [just-mentioned item] rots right away.' (2;61)

b. Miaw.an aj ki a-t-iran.
all.just D D TV-eat-PASS
'All this is eaten.' (3;22)

c. Aj ki napaty.e, wax ngo m-e-nday a nawijk.
D D ugly.RFL when not SB-2-conocer D book
'It's bad, when you don't know how to read.' (3;22)

The particle *ki* is what contributes the proximal-deictic meaning, as evidenced by some of its other uses shown in (5.68): the phrase *ot o ki* 'así, like this' (with phonetic variants *ot ki*, *at o ki*) and the phrase *ja o ki* 'Allí (está)' ('(T)here's') + Noun. The latter of these is sometimes reduced to *jo ki*, and can also be followed with a noun to form a complete utterance. The morphological identity or semantic properties of the *o* in these expressions is not known.

(5.68) Phrases with proximal *ki*

a. At o ki k-a-ol-iran a joy.
as this k-TV-tie-PASS D hammock
'This is how a hammock is tied.' (2;145)

b. Ja o ki a-long-iuf.
there DUR-hang-3PL
'(T)here they are, hanging.' (2;118)

c. Jo ki mi-kamix.
there POS-shirt
'Here's your shirt.' (2;68)

The phrase *aj ke*, with the distal particle *ke*, functions as a demonstrative pronoun meaning roughly 'that, that one', which I have rendered with personal pronouns in the translations of the following examples.

(5.69) Demonstrative-pronoun use of *aj ke*

a. ... a-ndiak aj ke loke t-a-kiuj ta ñu
TV-speak D D REL CP-TV-with MOT him
'... says the one who took him.' (2;24)

b. E. aj ke nalyeng n-a-jiong-an akiup
E. D D truly 1SB-TV-dance-PL with
'E. [woman's name], she I really danced (a lot) with.' (2;108)

For noun phrases with overt nouns, *aj* is used with a different particle, *ka*. This *aj ka* is preposed to the noun and seems to mark definiteness. It differs from plain *a* in that it can occur sentence-initially and with arguments having a certain degree of focus.

(5.70) *Aj ka* + Noun

a. Aj ka pi dyu-m-a-mily a us.
D D chicken PROG-SB-TV-pick.up D corn
'La gallina está pepenando el maíz.' (2;67)

b. Aj ka ion dyu-m-a-joy.joy a joy.
D D air PROG-SB-TV-sway D hammock
'The wind is swaying the hammock.' (2;65)

Demonstrative phrases such as 'this X' and 'that X' use *aj ka* preposed to the noun as well. The proximal/distal distinction between 'this' and 'that' is expressed with an additional *ka* (proximal) or *ke* (distal) typically postposed to the noun. The particle *ke* is rather transparently related to the spatial deictic *kej* 'there'. There is also a 'that over there' (very distant) category, expressed with *kion*.

(5.71) Proximal and distal demonstratives

a. Aj ka kuchil ka ngo m-a-jior u-xing.
D D knife D not SB-TV-have POS1-nose
'Este cuchillo no tiene filo.'/'This knife is not sharp.' (2;69)

b. Aj ka naxuy ke ñitoty.
D D man D cripple(d)
'That man is crippled.' (2;69)

c. Aj ka naxuy kion ndy-a-mbe-e akiup mi-chij.
D D man D PROG-TV-fuss-RF with POS-younger.sibling
'That man is fighting with his younger sibling.' (1;99)

There is reason to believe that *aj ka* + Noun is actually *aj ka a* + Noun, with an article before the noun that is reduced just like other sequences of identical vowels in unstressed positions (§2.2.6); sentence-level accents in these phrases always fall on *aj* and on the stressed (final) syllable of the noun. The article *a* can be heard when some other element intervenes between *ka* and *a*, such as in the following sentence. There are also NPs of the structure *aj a* + Noun.

(5.72) Evidence for article *a* in demonstrative NPs

Aj ka (a)n a naty ka t-a-ngot-os ñinga.
D D just D day D CP-TV-come-1 here
'Este día no más llegué aquí.'/'Just today I came here.' (2;76)

In addition, *ka* can take the plural suffix *-w* (identical to the 3rd person plural *-f* but for lack of the aspiration component; see §2.5.1). Note that the demonstrative particle is marked for plurality even though most nouns lack a morphological plural. With plural noun phrases of this type, the initial *aj* is frequently omitted, as in (5.73b).

(5.73) Plural marking on determiner

a.

Aj	ka-w	a	kuk	ke	ndy-a-j.lal-iuf.
D	D-PL	D	bird	D	PROG-TV-fly-3PL

'Those birds are flying.' (1;156)

b.

I-jaw	tiol	ndo-m	m-e-yak	m-e-chup-ijch	ka-w	a	xur	ka
2-see	if	can-SB	SB-2-put	SB-2-fill-CAUS	D-PL	D	pot	D

'See if you can fill those pots.' (2;2)

Sometimes (especially when there is hesitation about the head noun) the determiner *ke*, normally postposed to the noun, is preposed instead. In (5.74a), *ke* is repeated after the noun as well, but this is not always the case. Two other common constructions using *ke* are *aj ke* + (a) + Noun, in (5.74b); and *a* + Noun + *ke*, in (5.74c).

(5.74) More syntactic configurations of *ke*

a.

La	ndo-Ø	m-a-sa	ñu	chu,	aj	ka	ke,	aj	ka	ke	ñumbasaik ke...
PF	done-ITR	SB-TV-tell	him	QUOT	D	D	D	D	D	D	nahual D

'(She) had now told him, that, that nahual...' (080523-Be_4b)

b.

T-a-j.muly	aj	ke	a	kius.
CP-TV-enter	D	D	D	dog.

'That dog went in.' (080523-Be_4b)

c.

kuñ	i-m-e-rang	akiup	a	tomion	ke
what	FT-SB-2-do	with	D	money	D

'[We'll come see] what you do with the money.' (3;4)

The present treatment of Huave articles and demonstratives has only begun to scratch the surface. To give an idea of the complexities awaiting future investigation, (5.75) gives a selection of examples which are variations on and/or do not fit into the constructions already discussed.

(5.75) Other examples of determiners

a. Xa-xiw aj ka naxuy loke al-tsot-o-m.
1POS-cuñado D D man REL DUR-sit-V-SB
'My brother-in-law is the man who is sitting.' (3;39)

b. Aj loke a-lomb-o-m ke...
D REL DUR-stand-V-SB there/D?
'He who is standing...' (3;39)

c. aj mi-iow a kañ
D POS-water D dulce
'the/that syrup of the *dulce*' (2;36)

d. Xiok ndyu-n-a-chup-ijch miaw.an a xur ka
I PROG-1SB-TV-fill-CAUS all D pot D
'I am filling all these pots.' (2;2)

e. Al m-a-j.laik fundado kambaj ka xiok t-a-rang-as cocinera.
at SB-TV-be founded town D I CP-TV-do-1 cook
'When this town was founded, I served as a cook.' (060131-Ep3)

f. aj ka sabado a-liok ka
D D Saturday TV-come D
'este sábado que viene' (2;47)

g. Aj ke napaty.e a xiol ka a-wit-ich tolonts xi-wix.
D D ugly.RFL D stick D TV-raise-CAUS blister 1POS-hand
'That ugly/rough stick raises blisters on my hand.' (2;69)

With proper names for people, *pe* is preposed as a sort of title for men and boys, and *pa* for women and girls. Noun phrases translating to 'that X', where X is a proper name, are formed with the article *aj* + *pe* or *pa*, also sometimes (though not always) with generic words referring to people.

(5.76) Usage of *pe* and *pa*

a. Pe Pablo dyu-m-a-kaj ñuaf
P Pablo PROG-SB-TV-look.for them
'Pablo is looking for them.' (2;75)

b. Jo pa gringa, l-a-pe?
re P gringa PF-TV-arrive
'And the gringa, has she arrived?' (2;?)

c. Anop, aj pa maestra ke, t-a-m nday México.
one D P teacher D CP-TV-go toward Mexico.City
'One, the teacher, went to Mexico City.' (060131-Ep1)

d. aj pe n-a-tang xa-kwal
D P ST-TV-grow 1POS-child
'He, my older son' (060131-Ep2)

5.4.3 Space, time, location

Spatial deictics include *ñinga* 'aquí, here' and *ñingion* 'allá, over there', which like the nouns in (5.34) are structurally analyzable as the prefixal sequence of *n* (stative) + *i* (theme vowel) attached to monosyllabic roots. These roots, *-nga* and *-ngion*, are transparently related to the just-discussed demonstrative particles *ka* and *kion*, differing only in voicing of the initial consonant. Also built on these demonstratives are the words/phrases *toka* and *tokion*, which also mean roughly 'here' and 'there', though the contexts of their use are restricted relative to *ñinga* and *ñingion* in ways I do not yet understand. They are usually though not always used in expressions of motion 'to/from here' or 'to/from there'.

A generic spatial deictic *kej* or *tikej* 'allí, there' is used to refer to a "there" that is apparent either from the preceding discourse context or visual cues in the immediate situation. It is used for points in time as well as points in space.

Huave has two main prepositions, *wax* 'on' and *tiol* 'in, at, to', the latter of which sometimes occurs in the reduced form *ti*. As one might expect, each of these extends to a wider range of contexts than its rough English gloss. These are complemented to a certain extent by words specifying locations with respect to a reference object, such as *u-mbas* 'its front', *u-miajts* 'its inside', *u-mal* 'its head/top', *u-lyej* 'its foot'. A systematic study of the expression of spatial relations is beyond the scope of this thesis, but an effort will be made to sprinkle relevant example sentences throughout the current work.

Some directional or locational particles in Huave are typically postposed to verbs. The word *tiot* is very commonly used to mean 'down, downward'. It clearly comes from the proclitic *ti-* from *tiol* 'in', plus *iot* 'earth.' It is also used of actions that take place on the ground (such as a snake slithering along), and with a variety of other verbs where its use is conventionalized despite the lack of apparent connection to downward motion or earthbound location. Its opposite *kafax* means 'above'; it is built on the preposition *wax* with the addition of a nominalizing prefix string *k-aj-* (nominalizing *k-* plus idiosyncratically aspirated theme vowel). Impressionistically, it is much less frequent (perhaps due to the extragrammatical factor of gravity and the concomitant frequency of relevant events in the real world), and may or may not prove to have a different syntactic distribution.

(5.77) Usage of *tiot*, 'down(ward), below, on the ground'

a. T-aj-toch i t-a-ndach tiot.
CP-TV-trip and CP-TV-fall down
'S/he tripped and fell.' (2;16)

b. T-a-monch-ius tiot a sox.
CP-TV-pull.out-1 down D grass
'I pulled the grass out from the ground.' (2;75)

c. T-a-uy-uj xiok tiot a mu.na.ngich.
CP-TV-circle-3PL me down D youth
'The boys surrounded me.' (2;66)

Ta occurs in complex verbal expressions like *-kiujp ta* 'take' (compare *-kiujp mion* 'bring'), and seems to indicate motion from one place to another. Its more specific semantic nuances have not yet been studied. It occurs in expressions like *I-nday ta!* 'Bon voyage!' (built on the verb root *-nday* which has the approximate meaning of 'learn, be(come) acquainted, orient oneself') and is attested in the spontaneously produced example in (5.78c), addressed to me and the next Huave speaker I was about to work with, which might tentatively be translated as 'Talk away!'

(5.78) Directional *ta*

a.

I-m-a-kiujp-aw	ta	leng	k-aj-laik	a	kumbaly.
FT-SB-TV-take-3PL	MOT	LOC	k-TV-be	D	comadre

'They'll take [them] to where the comadre is.' (2;48)

b.

T-a-tarrar	ta	nax
CP-TV-take	MOT	girl

'Llevó la muchacha.' (4;52)

c.

I-ndiak-an	ta	pues.
2-speak-PL	MOT	so

'So, talk away!'(?) (4;14)

Two other locational/directional function words are *mion* (motion from a source; sometimes occurs in its non-diphthongized form *min*) and *nday* (motion toward a goal). These can function as prepositions, though they usually require the relevant source or goal to be also be marked with *ti(ol)* or *wax*. *Mion* can be postposed to verbs.

(5.79) Directional *mion* and *nday*

a.

A-j.ngot	mion	tiol	a	poza.
TV-come	from	at	D	well

'S/he is coming from the well.' (2;98)

b.

dy-a-mung	a	nday	wax	u-mal	a	tiok
PROG-TV-crawl	D	toward	on	POS1-head	D	hill

'S/he is crawling up the hill.' (3;17)

c. Ke mion i-j.ngot?
where from 2-come
'Where do you come from?' (2;111)

d. Ñu i-m-a-kaj ke nday m-a-xum a tomion
he FT-SB-TV-search where toward SB-TV-find D money
'He will look for where to find money' (2;40)

e. A-kiu mion a ndix wax mi-pek
TV-take from D firewood on POS-shoulder
'He brings the firewood on his shoulder.' (2;75)

f. I-lox mion!
2-throw from
'Throw it (from where you are to here)!'

Al is used to express static location, either in space or in time. With temporal location, it is used to indicate when an event happened relative to another event. (See also the durative aspect in §6.3.6.)

(5.80) *Al*: location in space or time

a. Ke k-a-j.laik? Al México.
where k-TV-be LOC Mexico.City
'Where is he? In Mexico City.' (2;110)

b. Al n-a-pe t-a-xijp-ius
when 1SB-TV-arrive CP-TV-bathe-1
'When I arrived, I bathed.' (2;55)

A feature of *al* is that it can be inflectionally marked for person and number, as shown in the paradigm in (5.81). Although the plural forms are not transparently built on *al*, I assume that they are reduced forms of original **salnan*, **ilnan*, etc. with the *l* deleted in the transition to single-wordhood (as Huave prohibits word-medial codas), along the lines of the variation between *l*-fulness and *l*-lessness that is synchronically attested in the durative aspect (§6.3.6). Note that in the second-person plural form, this means that neither segment of the original *al* is left. When prompted with the historically multiple first-inclusive pronoun, the speaker produced "*kunajts anar ti joy*," using the same form of *al* as with the historically minimal pronoun.

(5.81) Inflected locative *al* (1;169)

xiok s-al ti joy I 1-at in hammock 'I am in the hammock'	xinan s-a-n-an ti joy we.ex 1-at-N-PL in hammock 'We (excl.) are in the hammock'
iok i-l ti joy you 2-at in hammock 'You (sg.) are in the hammock'	inan i-n-an tiol a joy[4] you.pl 2-N-PL in D hammock 'You (pl.) are in the hammock'
ñu al ti joy s/he at in hammock 'S/he is in the hammock'	ñuaf a-n-af tiol a joy they at-N-3PL in D hammock 'They are in the hammock'
kunar a-n-ar ti joy we.inc at-N-INC in hammock 'We (incl.) are in the hammock'	

The words for 'left' and 'right' are, respectively, *kiam* and the Spanish loan *derech* (2;37). The cardinal directions are *nawanaty* 'east', *namulyety* 'west', *kajlay* 'north' and *kafak* 'south'. The word for 'east' is a *na-* nominalization of the root *w* 'salir' plus the article *a* and word *naty* 'sun' - literally, the place where the sun comes out. The word for 'west' is a *na-* nominalization of the root *muly* 'enter'; presumably the remaining segmental material *ety* is a reduction of *naty* 'sun' so that the word originates from a phrase meaning 'where the sun goes in' ('donde entra el sol').

This concludes the discussion of spatial deictics; I will now briefly list a few temporal deictics. Aside from the anaphoric *kej* 'then', mentioned in the section on spatial expressions, there are a number of closed-class words referring to time. The word for 'now' is *kana*. The word for the immediate past is *katsats*, and that for the immediate future is *kanen an*; both of these translate to Spanish 'ahorita'. In (5.82) is a table of words referring to the present day and year, as well as days and years in the

[4] The variation between *ti joy* and *tiol a joy* is not important here.

recent past and the near future. Notice the use of the demonstrative particle *ka*, and the fact that words referring to the past begin with *t-*, which is also the completive affix.

(5.82) Words referring to days and years

	-2	-1	0	+1	+2	+3
Days	tamawior	tim ‘yesterday’	naty ka ‘today’	uxup ‘tomorrow’	nawior	nangaj poj naty
Years		tañiat ‘last year’	ñiat ka ‘this year’	nañiat ‘next year’	nangam ñiat (2;153)	

Other: *tapojt* ‘last night’, *tilay* ‘earlier today’ (‘adelante’), *maw naty* ‘a day or two from now’ (2;77)

5.4.4 Numerals

Huave has several sets of numerals for counting different types of objects, though distinct numeral classes only go up through ‘2’ or ‘3’. Only very few speakers know Huave words for numerals past ‘4’; Spanish numerals are widely used, and there is no separate Huave set of ordinals.

The words for 1-3 in the five numeral classes are shown in (5.83). The A group is used to count people, animals with four legs, and some objects. The B group is a default, used for most objects, birds, and abstract things like days. The C group is used for long, thin objects such as hammocks, snakes, and sticks. The D group is the sequence that is used to count years, e.g. *anom ñiat* ‘one year’. Lastly, the E group is used with the Spanish loan *vuelt* to count how many times something has happened, e.g. *ajmbaw vuelt* ‘two times’. (Another Spanish loan for counting ‘how many times’, *viaje*, takes the numbers of the B group.)

In all the series except D (which is a hybrid of B and E), the number ‘two’ is formed with *aj-* + the final consonant of the same series’s word for ‘one’ + a suffix *-Vw* (which shows up in multiple places elsewhere in the language as a plural marker (e.g. in the determiner *ka-w*), and may also be considered as such here). For series E, it is relevant to note that prenasalized stops reduce to nasals word-finally, so the m/mb alternation, being phonologically regular, is consistent with this generalization.

(5.83) Basic numerals

	A	B	C	D	E
1	anop	anek	anots	anom	anom
2	ajpaw	ajkiaw	ajtsaw	ajkiaw	ajmbaw
3	arujpaw	aruj	aruj	aruj	arujmbaw

The rest of the numerals through 10 are: *apokiuf* (4), *akokiaf* (5), *anajoyuf* (6), *ajayuf* (7), *anoyuf* (8), *apekaf* (9), and *akapaf* (10). These words all end in -*Vf*, a plural suffix (identical to the third-person plural). One speaker remembers a word for '20', *ñimiow*. It may be noted that the original Huave numeral system, to judge from San Mateo del Mar (Stairs and Hollenbach 1981:398), was base-20.

There are a few constructions involving morphological modification of the number words. Besides the person- and number-marking seen in the beginning of this subsection, the words for 'one' can be prefixed with *al-* to mean 'another', as in (5.84ab). It is not known whether *al-* can be prefixed to numbers greater than 1. Another type of prefix is *mi*, which gives a definite reading as in (5.84cd); in these cases the initial *a-* is dropped. Lastly, there are reduplicated forms like in (5.84e).

(5.84) Proclitics on numerals

a. T-a-jants-as al.anom vuelt
CP-TV-wash-1 another time
'I washed (it) again.' (1;138)

b. Mu-na.w wastiok al.anek tono k-a-jir-af.
PL-native San.Dionisio another tone G-TV-have-3PL
'The San Dionisio Huaves, they have another tone (accent).' (2;152)

c. mi-rujpaw ñunch mi-kwal
MI-three boy POS-child
'Her three kids are boys.' (2;105)

d. mi-jkiaw 'los dos' (2;73)
MI-two

e. ajpaw.paw 'two by two' (2;76)
two.RED

5.4.5 Other

Huave has the basic interrogative words in (5.85), which are generally used both in questions and as indefinite pronouns. Of these, the only one with identifiable internal morphological structure is *konol* 'why', which appears to be built on the root *-nol*, which means 'to have a problem or issue'. All are also used as indefinite pronouns.

(5.85) Interrogative words

a. kuñ 'what'
b. jang 'who'
c. ke(j) 'where'
d. keñ 'how' (also: keñ a moð, lit. 'how-the-way')
e. ngañ 'which one'
f. ngaty 'when' (past)
g. ngoy 'when' (future)
h. ngoy 'how much'
i. kas 'how many'
j. konol 'why'

The few negative indefinite pronouns in my data are formed with the prefixation of *ñi-* onto a familiar base element, whether *-kwej* (cf. §5.3.2) or a corresponding interrogative word (5.86bc).

(5.86) Negative indefinite pronouns

a. ñi-kwej 'nothing' (cf. *kwej an* 'anything', 4;46)
b. ñi-jang 'nobody'
c. ñij-ke 'nowhere'
d. ñi-ngañ 'no (+ noun)'

In (5.87) is a list of subordinating conjunctions. Note the overlap of the set of subordinating conjunctions with the set of locative prepositions: the already-discussed function words *wax*, *tiol*, and *al* all have grammaticalized uses in subordination. As for the others, *ndo-* is also a verb root meaning 'to be complete'; *ndo* is the third-person singular form (the suffix -*w* that would normally occur in such forms fails to appear due to phonologically regular labial dissimilation). The conjunction *me eñ* 'when' is often reduced to *meñ* and is probably related to a poorly understood word/particle *eñ*. Additionally, there is a word *pot* that is used for counterfactuals, and a two-particle sequence *se ko* (both stressed as if they were independent words) meaning 'although'.

(5.87) Subordinating conjunctions

a. wax 'when'
b. al 'when'
c. me eñ 'when'
d. tiol 'if'
e. ndo 'after'
f. se ko 'although'
g. pot 'if (counterfactual)'

Sometimes, especially in connected, spontaneous speech, subordinate clauses which one might expect to be introduced with a conjunction meaning 'when' do not have any conjunction at all; they are simply expressed with a head verb that is marked with subordinate morphology. The relationship between the clauses is understood from context. This goes along with a more general lack of overt complementizers; complement clauses often look just like main clauses except for having the verb in the subordinate.

Other subordinating conjunctions in use come from Spanish. In particular, *porke* 'because' (Sp. porque), *par* 'in order to' (also used as a preposition 'for') and *pores* (Sp. por eso) 'because of that, therefore' occur with high frequency.

5.5 Morphological adaptation of Spanish loans

Importation of loan verbs from Spanish is productive and frequent. The basic loan verb construction is the bound verbal root *-tajk* (apparently a light verb), inflected for person, number, and tense/aspect (i.e. all relevant inflectional categories), followed by the Spanish infinitive. I do not have examples of loan verbs from languages other than Spanish, although it is possible that some verb roots originally came from other languages and were nativized such that their loan status is not obvious to me. Some examples of spontaneously produced loan verbs are given in (5.88). Note that in a couple of the examples, the root *-tajk* surfaces as *-ta*. This is because word-final consonants following aspirated vowels are often deleted (§2.3.1), hence dropping of the root-final *k* of *-tajk* in the absence of suffixation. Particularly in the case of *-tajk* the aspiration is often weakened when the final consonant is dropped. The exact conditions for these alternations and the phonetics of the resulting surface forms are not known; to my ear there is no audibly conspicuous compensatory lengthening (see also §2.1.3).

(5.88) Loan verbs

a.

Xiok	<u>la</u>	<u>n-a-ta</u>	<u>jurar</u>,	ot	ki	i-m-u-ngoch	xi-wix.
I	PF	1SB-TV-do	swear	as	this	FT-SB-TV-receive	1POS-hand

'I've sworn that this is how I'll get married.' (2;143)

b.

<u>T-a-ta</u>	<u>seguir</u>	m-a-rang	najiot.
CP-TV-do	continue	SB-TV-do	work

'He continued doing work.' (2;142)

c.

<u>Dyu-m-a-tajk-ar</u>	<u>cosechar</u>	meloñ.
PROG-SB-TV-do-INC	harvest	melon

'We (incl.) are harvesting melon.' (2;129)

Derivational morphology takes the form of Huave morphemes on the root *-tajk* rather than a Spanish morpheme on the loan infinitive. In the examples in (5.89), reflexive and passive suffixes are appended to *-tajk*, while there is no change to the Spanish infinitives. One area for further research is the morphological realization (or lack thereof) of derivational categories that are only present in one of the two languages, or of roughly corresponding categories that exist but might not apply to exactly the same range of situations.

(5.89) Derivational morphology on loan introducers

a. i-tajk-e salvar
2-do-RFL save
'you save yourself' (in religious context) (4;46)

b. a-tajk-ach invitar
TV-do-PASS invite
'is invited' (2;146)

As far as I know, pronominal objects are the only constituents that can intervene between the loan-introducing light verb and the loaned infinitive. In this position, the pronouns never have phrase-level stress, and might be seen as enclitic on the main verb.

(5.90) a. T-a-tajk-aw ñu invitar
CP-TV-do-3PL him invite
'They invited him' (2;142)

b. Ngo n-a-ndiom n-a-ta iok atrasar.
not 1SB-TV-want 1SB-TV-do you delay
'I don't want to delay you.' (2;32)

c. T-a-ta xiok molestar.
CP-TV-do me bother
'It bothered me.' (2;44)

Outside of the loan verb construction, I have very few attestations of the root *-tajk*, so its precise usage in collocations with native words is unclear, but it appears to be a sort of light verb with roughly the meaning of 'do, make'.

(5.91) Dyu-m-a-tajk-aw m-a-j.ñe a rran.
PROG-SB-TV-do-3PL SB-TV-good D electricity
'They're fixing the electricity.' (2;135)

A potential second category of loan verbs are those where a Spanish verb has itself been adapted into a root that can take direct verbal inflection. The following example is from a speaker who is not fully fluent, so it is unclear whether this specific word and/or loan strategy is more widely used. Note that the Spanish verb has reflexive morphology, but there is no such corresponding morphology on the Huave verb.

(5.92) I-som!
2 appear
'mira, asómate' (1;152)

One hypothesis is that phonotactics contributes to suitability of Spanish verbs for direct adoption as Huave roots, having specifically to do with the fact that most Huave roots are CVC. The Spanish verb *asomar(se)* has a VCVC root preceding the infinitival ending *-ar*, but the initial vowel in fact creates a Huave-sounding verb word, as the *a-* is reminiscent of the prefixal theme vowel which occurs immediately before the root in all persons except second person in the default *a*-theme verbal paradigm.

On the other hand, the regional Spanish adjective *pupuso*, meaning roughly 'pale, weak' appears to have entered Huave as a root *-pos*.

(5.93) L-a-j.pos a jely tiol a naty.
PF-TV-pale D clothes in D sun
'The clothes have gotten old/bleached in the sun.' (4;24)

There is a very robust participle-loaning construction consisting of the root -*j.laik* 'exist' plus a Spanish *-ado/-ido* participle. The verb *-j.laik* has more generally been mapped onto the Spanish *estar* (e.g. in usages like *Keñ i-jlaik?* '¿Cómo estás?'), so this construction can be seen as a calque.

(5.94) Participle-loaning construction

a. Kej t-a-j.laik operado aj ka ke gran k-a-jior xa-pech.
there CP-TV-be operated D D D grano k-TV-have 1POS-chest
'There/then that growth on my chest was operated on.' (2;119)

b. S-a-la.j.k-ion encerrada.
1-TV-be-PL shut.in
'We (excl.) are shut in.' (2;105)

Nouns. Generally, nouns are borrowed as bare roots, with only phonological modifications. This is as opposed to another logical possibility, which is that loanwords would fall in the other major category of nouns and show up as roots with Huave stative or nominalizing morphology prefixed onto them. One exception is the word *ñi-mux* 'homosexual' (3;94), which is a Zapotec loan (ultimately from Spanish *mujer*) and exists interchangeably alongside a bare-root version *mux*.

Adjectives/Adverbs. Like nouns, adjectives and adverbs tend to be borrowed from Spanish with phonological modifications only, without the addition of morphological material.

(5.95) Loan adjectives

a. S-a-j.laik triste
1-TV-be sad
'I am sad' (2;22)

b. Xiok x-i-n-a-jch iok m-e-rang ríko
I 1-FT-1SB-TV-give you SB-2-do rich
'I will make you rich.' (DF)

However, there is variation in the position of a loan adjective relative to a noun. More assimilated or nativized loan adjectives occur preceding the noun, as Huave adjectives do (cf. the examples above in §5.2), but adjectives from Spanish are also frequently attested following the noun. As with syntactic issues more generally in Huave, further research is necessary.

(5.96) A + N word order

a. anots derech xiol
one straight wood
'a straight stick' (3;29)

b. T-a-j.ngot a ion, i komo a-j.laik falsa wiujt...
CP-TV-come D wind and as TV-be false sand
'The wind came, and as there was false sand...' (A Lom)

N + A word order

c. aj ka mu-najta sola, mu-najta viuda
D D PL-woman single PL-woman widow
'the single women, the widowed women' (A Lom)

Chapter 6

Verbal Morphology

This chapter provides an overview of Huave verbal morphology. It is divided into the following topics: verbal stem types and basic conjugations (§6.1), nonfinite verb forms (§6.2), person/number and tense/aspect inflection (§6.3), valence-changing derivational morphology (§6.4), and morphophonological derivation (§6.5). Affix order, which is morphologically specified and not predictable according to syntactic or semantic factors, will be the topic of Chapter 7.

Transitivity alternations manifest themselves in diverse ways, both productive and non-productive, and will be a recurring theme throughout the chapter. In terms of inflectional morphology, many person, number, and tense/aspect categories have identifiable and unique markers, which leads to a superficial impression of Huave as a primarily agglutinating language. However, there is also a fair number of affixes that contain information for more than one of these categories, and there are also cooccurrence restrictions on certain combinations of affixes. As originally pointed out by Matthews (1972) for the dialect of San Mateo del Mar, the result is that in a given verb form, some of the abstract inflectional categories might be multiply exponed, while others may not have a unique marker or even any overt one at all. Although the structure of the inflectional system will not be comprehensively analyzed here, this general fact is useful to keep in mind.

6.1 Stem Structure and Basic Inflection

6.1.1 Prefixing and Suffixing Verbs

As mentioned in §5.1, verb roots can be divided into two types: prefixing and suffixing. Prefixing verb roots include all transitives and some intransitives. Suffixing roots are all intransitive and consist roughly of unaccusative-type verbs. Despite the fact of rough semantic generalizations, however, the prefixing versus suffixing status of intransitive roots is not predictable based on their meaning, so it must be considered as lexically listed. A few verb roots form alternations where the transitive member is prefixing and the intransitive member is suffixing; again, the availability of this alternation also appears to be lexically listed, as Huave has a variety of strategies for the morphological expression of transitivity alternations (see §6.4).

For purposes of comparison, lists of prefixing and suffixing intransitive roots are given in (6.1) and (6.2), some of which are grouped along semantic category lines. It can be seen that prefixing intransitives are more toward the active and volitional end of the stative-active spectrum, including verbs of motion and bodily function. In contrast, suffixing intransitives cluster more around nonvolitional and stative/change-of-state verbs, for example body-posture verbs and various inchoatives of disintegration. Nevertheless, there is some apparently idiosyncratic overlap, with prefixing inchoatives and a suffixing verb of emotion, for example. Also, the two verbs meaning 'ascend' or 'rise' are in different categories. Notice that some of the prefixing intransitive roots have an aspiration on the theme vowel (also attested in transitivity alternations such as in passive forms), which I represent orthographically as an *j* appended to the lefthand side of the root, though I will not gloss it separately.

(6.1) Examples of prefixing intransitive verbs

a. Bodily function: -*kwik* 'laugh', -*me* 'sleep', -*chuly* 'urinate', -*ndoik.ndoik* 'hiccup', -*j.tiorr* 'vomit'
b. Verbs of being: -*ki* 'linger, stay', -*j.laik* 'exist'
c. Emotional state: -*j.kay* 'be/get angry', -*mbol* 'be afraid', -*xing* 'be ashamed'
d. Change-of-state: -*j.mba* 'shatter, break', -*xip* 'swell up, get fat'
e. Motion: -*k(w)ior* 'run', -*j.miok* 'descend', -*j.tip* 'ascend', -*j.lich* 'fall', -*j.ndach* 'fall', -*pe* 'arrive', -*j.tsor* 'leave to go home', -*mb* 'go', -*j.ngot* 'come', -*liok* 'come' (atelic?), -*j.muly* 'enter', -*w* 'exit'
f. Other: -*ndyu* 'die, get cold', -*ndajp* 'burn'

(6.2) Examples of suffixing intransitive verbs

a. Body posture (Augmentative/Diminutive): -*pajk*- 'be/lie face up', -*mojk-/-mujk*- 'be/lie face down', *ntsojl-/nchujl*- 'be/lie on side', *tsot-/chut*- 'sit', *pej-/pij*- 'lie', *wit*- 'get up, rise', *lomb*-/*lyumb*- 'be raised, stand'
b. Emotional state: *mbay*- 'be shocked, have a fright'
c. Inchoative: *ndoijk*- 'break, cut', *pandy*- 'rot', *xejp*- 'come unstuck', -*chujty*- 'come untied', *chupy*- 'fill up', *pots*- 'begin'
d. Other: *wejk*- 'be born', -*chilip*- 'spill', *chij*- 'quiet down', *pak*- + Reflexive -*e* 'be visible', *ndil*- + Reflexive -*e* 'turn one's head'

6.1.2 Atemporal Paradigm

Prefixing verbs. Prefixing verbs can occur with one of two prefixal theme vowels. The theme vowel *a*- is the most basic and common; all roots that take a theme vowel can take *a*-. (The other theme vowel, *u*-, will be the topic of the next subsection.) Except with inherent intransitives, *a*-themes imply a direct object, and speakers translate *a*-theme verbs into Spanish as object clitic *lo* 'it' plus verb. The tables in (6.3) and (6.4) show the atemporal *a*-theme paradigms of two prefixing verbs. The atemporal is a tense/aspect category with only person and number marking, with no overt tense/aspect morphology. It is used primarily for ongoing or habitual actions in the present and past.

In the paradigms, italicized vowels are those whose quality varies but is phonologically predictable according to the principles of vowel harmony as described in

Chapter 4. The form in (6.3) followed by an asterisk was not given in the particular paradigm in the page cited here from my fieldnotes, but is constructed from attested forms of the same tense/aspect with other roots in my data. Asterisked or otherwise uncited forms elsewhere have either been similarly constructed, or taken from lists from early stages of research that were based on my notes but did not include page citations.[1]

(6.3) Atemporal paradigm, prefixing verb (1;162)

s-a-ndiom 1-TV-want	s-a-ndiom-*a*n 1-TV-want-PL
i-ndiom 2-want	i-ndiom-*a*n 2-want-PL
a-ndiom TV-want	a-ndiom-*a*f TV-want-3PL
a-ndiom-*a*r* TV-want-INC	

(6.4) Atemporal paradigm, prefixing verb (1;174)

s-a-jch 1-TV-give	s-a-jch-*io*n 1-TV-give-PL
i-jch 2-give	i-jch-*io*n 2-give-PL
a-jch TV-give	a-jch-*io*w TV-give-3PL
a-jch-*io*r TV-give-INC	

During the elicitation of the paradigm in (6.3), when supplied with the historical first-inclusive multiple pronoun *kunajts*, the speaker gave the first-exclusive form *sandioman*. On the other hand, for (6.4) the speaker gave the first-inclusive form *ajchior* for both of the first-inclusive pronouns.

A number of structural observations about person and number marking can be made here. One is that there is no dedicated person marker for either third or first-

[1] I have only constructed words which I believe to actually exist in my data, but for which a citation was not immediately forthcoming. Conversion of the data to searchable format, in addition to future fieldwork, should eliminate constructed forms from the grammatical description.

inclusive persons. Instead, third and first-inclusive person are marked with portmanteau suffixes that indicate both person and plural number (where applicable: third-person singular is a bare stem consisting of root and theme vowel). It is interesting that all verb forms referring to more than one person take suffixes, which undercuts Stairs and Hollenbach's (1981) division of the pronouns into "minimal" and "multiple" and instead suggests a natural class "plural" to which *both* the first-inclusive forms belong.

Another observation is that the second-person prefix *i-* overwrites the theme vowel or otherwise causes it not to appear in second-person forms. The second-person prefix has several allomorphs; although we only see the *i-* allomorph so far, I will briefly describe the allomorph conditioning here in order to provide context for paradigms to follow.

Second person is marked by a front-vowel prefix *i-* or *e-*. The distribution of these two allomorphs is morphologically governed: *e-* occurs in the presence of the completive and subordinate affixes, and *i-* occurs elsewhere. The alternation can be seen in the following forms. The vowel quality can only be diagnosed with prefixing, single-segment roots, because with monosyllabic and larger roots, the second-person prefixes occur in nonfinal (i.e. unstressed) syllables, where vowel reduction (§2.3.3) collapses the distinction between high and non-high vowels. However, in monosyllabic verb forms the difference is clear.

(6.5) Second-person allomorphy

i- allomorph		e- allomorph		e- allomorph	
a. i-ty 2-eat	'you eat'	c. m-e-ty SB-2-eat	'(that) you eat' (1;82)	e. t-e-ty CP-2-eat	'you ate' (1;95)
b. i-jch 2-give	'you give' (1;174)	d. m-e-jch SB-2-give	'(that) you give' (3;65)	f. t-e-jch CP-2-give	'you gave' (1;95)

Due to phonologically productive diphthongization in closed final syllables (§2.2.3), the second-person prefix has two further surface allomorphs.

(6.6) More second-person allomorphy

io- allomorph (diphthongization from *i-*)

a. io-m (from /i-m/)
2-go
'you go' (1;133)

ia- allomorph (diphthongization from *e-*)

b. t-ia-m (from /t-e-m/)
CP-2-go
'you went' (1;124)

c. m-ia-m (from /m-e-m/)
SB-2-go
'(that) you go' (2;104)

Suffixing verbs. Suffixing verb roots require vowel-final stems as the input to Layer 1 and higher morphology. If the root is consonant-final (as most roots are), a vowel is added, and its quality is determined purely phonologically according to regular vowel harmony, prior to further affixation. Roots that are already vowel-final do not add any phonological material. The presence or absence of the post-root vowel thus depends on the phonotactics of the root. Since the quality of this vowel is phonologically determined, there is no opposition of semantically or morphosyntactically contentful "theme vowels" the way there is with *a-* and *u-* in prefixing verbs. The atemporal paradigm for a consonant-final suffixing root *wit-* 'rise' is shown in (6.7), and the one for a vowel-final suffixing root *pej-* 'lie down' is shown in (6.8). Because this speaker diphthongizes the root vowel (see §4.6.2), the root surfaces as *piaj-*. See §2.5.3 for explanation of the aspiration deletion alternations.

(6.7) Atemporal paradigm, suffixing verb (C-final root) (1;161)

wit-*io*-u-s rise-V-ITR-1	wit-*io*-u-s-un rise-V-ITR-1-PL
i-wit-*io*-r 2-rise-V-2ITR	i-wit-*io*-r-u-n 2-rise-V-ITR-2ITR-PL
wit-*io*-w rise-V-ITR	wit-*io*-u-j rise-V-ITR-3PL
wit-*io*-u-r* rise-V-ITR-INC	wit-*io*-u-jts rise-V-ITR-INC

(6.8) Atemporal paradigm, suffixing verb (V-final root) (1;165)

piaj-u-s lie-ITR-1	piaj-u-s-un lie-ITR-1-PL
i-pia-r 2-lie-2I	i-pia-rr-u-n 2-lie-2I-ITR-PL
pia-f /pej-w/ lie-ITR	piaj-u-Ø lie-ITR-3PL
piaj-u-r lie-ITR-INC	

The atemporal paradigm of the suffixing verbs contains all the person and number affixes found in the prefixing paradigm, plus two additional morphemes associated with intransitivity. One is the second-person intransitive *r*, found immediately after the post-root vowel in the second-person singular and plural forms.

The other additional morpheme appearing in this paradigm is the intransitive [+round] suffix, which shows up as a round vowel or glide depending on syllable structure. Its distribution is somewhat complicated. In the third-person singular, we see that it attaches to the stem, and if no further suffixes follow, it surfaces as a word-final glide (which in (6.8) fuses with the root-final aspiration to form *f*). If further suffixation takes place, as in the first-person singular and first-person inclusive, it vocalizes to create a VC syllable with the consonantal suffix; there is hiatus between the suffix vowel and intransitive vowel. (In the appropriate vowel-harmonic context, namely where the suffix vowel is *o*, it vocalizes to *o* rather than *u*.)

This [+round] suffix is not always realized where it would be paradigmatically expected, depending on structural morphological conditions. Specifically, it does not surface when the form ends in a Layer 1 affix, as in the second-person singular; its non-occurrence will also be seen in conjunction with other Layer 1 affixes in the subordinate and completive paradigms below.

However, if there are then further suffixes past the Layer 1 affixes, [+round] shows up on the epenthetic vowel. The quality of this vowel would otherwise be determined by vowel harmony, so the fact that it surfaces as unexpectedly round can be taken as an indication that the intransitive [+round] is being realized on it. Further epenthetic vowels, such as the last vowel in the first-exclusive plural of (6.7) or (6.8), are predictable by vowel harmony and are no longer glossed as separate morphemes.

The exception to the epenthetic-vowel realization is with suffixing verbs that carry the reflexive suffix. The example in (6.9) illustrates a suffixing verb that has a reflexive suffix on it. Although there are epenthetic vowels present on subsequent suffixes, the [+round] suffix does not surface anywhere. One possible analysis is that [+round] cannot occur outside the Layer 2 reflexive suffix, since [+round] is Layer 1, and its manifestation on the epenthetic vowel would create an unacceptable linear contradiction for the affix hierarchy. There could also be a morphosemantic reason having to do with the reflexive suffix.

(6.9) Non-appearance of [+round]

a. Tim ndil-i-t-ey-as n-a-jaw
yesterday turn-V-CP-RF-1 1SB-TV-see
'Yesterday I turned around to see (it).' (2;1)

b. x-i-ndil-i-n-ey-an
1-FT-turn-V-1SB-RF-PL
'we (excl.) will turn around' (2;4)

6.1.3 Optional person-marking phenomena

Although verbs most often carry inflectional marking to agree with the subject only, object marking is possible, though infrequent. Many speakers seem to disprefer object marking, using overt pronouns in both elicitation and spontaneous speech.

Not all combinations of subject and object can be marked. The examples I have managed to elicit all have first- or second-person singular subjects and third-person plural objects. Although the affixes themselves are the same ones used elsewhere, with no formal difference between subject and object markers, the result of this pattern is that the object is always marked with a third-person plural suffix. The opposite readings (third-person subject and first-/second-person object) are logically conceivable, but do not seem to obtain; the third-person plural suffix is always interpreted as the object. Further investigation is necessary to find out if any other combinations of subject and object can simultaneously be marked on the verb.

(6.10) Object marking

a. s-a-kaj-aw
1-TV-look.for-3PL
'I look for them' (2;68)

b. dyu-n-a-kaj-aw
PROG-1SB-TV-look.for-3PL
'I am looking for them' (2;75)

c. t-a-xum-us-uØ
CP-TV-find-1-3PL
'I found them' (2;75)

d. Na(w) m-e-xum-uj
not SB-2-find-3PL
'You (sg.) didn't find them' (4;46)

e. dyu-m-e-kaj-aw
PROG-SB-2-look.for-3PL
'you (sg.) are looking for them' (2;75)

f. Kuñ i-mb-ich-iuf?
what 2-be.used.up-CAUS-3PL
'What do you want them for?' (2;75)

In two situations, person markers are optionally omitted where they are redundant, i.e. where the person category can be recovered from the presence and/or absence of other affixes in the word.

Second-person markers are very occasionally absent in second-person plurals, such as (6.11a); compare the full form in (6.11b). In second-person plurals, the lack of first-person marking combined with the non-3rd-person (and non-first-inclusive) plural ending is unambiguous. It is not known what range of contexts this is permitted in, nor how frequent or productive it is.

In spontaneous speech but never in elicitation, I also have a couple examples of first-person markers being omitted in the first-person exclusive plural (6.11cd). The plural suffix -*n* means that the form must be first or second person, and the lack of the second-person affix narrows it down unambiguously to first person. Again, more research on these forms is necessary before anything more can be said about them.

(6.11) Omission of redundant person-marking

a. ñ-i-anch-ion
ST-TV-lazy-PL
'you (pl.) are lazy' (1;163)

b. ñ-e-r-i-anch-ion
ST-2-2I-TV-lazy-PL
'you (pl.) are lazy' (3;29)

c. t-a-pey-an
CP-TV-arrive-PL
'we (excl.) arrived' (4;1)

d. L-a-kwet-an u-mbey-ajts.
PF-TV-leave-PL POS1-mouth-INC
'We (excl.) have abandoned our Huave language.' (3;43)

Another person-marking irregularity is that second-person singular imperative forms sometimes leave off second-person marking, using just the bare root. This is most frequent with verbs commonly used in the imperative, and even appears to be the preferred form with such verbs.

(6.12) Imperatives with bare roots

a. Kior i-lox kion!
run 2-throw over.there
'Go throw it over there!' (3;36)

b. Jaw keñ a moð.
see how D way
'Look at how they do it.' (2;131)

6.1.4 Theme Vowel *u-*

Besides *a-*, the other theme vowel that occurs with prefixing verbs is *u*, which is associated with intransitivity and valence reduction. It is important to note the morphological licensing condition on the theme vowel *u-*: it only occurs in the presence of a Layer 1 affix. Thus, the theme vowel *u-* is only possible for completives, subordinates, and second-person forms; elsewhere, the theme vowel *a-* is used.

We can distinguish three uses of the theme vowel *u-*. One is for detransitivized or generic-object readings of transitive verbs. With transitive verb roots, *u*-themes create readings where no direct object is expressed or implied. For example, the second-person singular form in (6.13) means 'you eat it' or 'Eat it!', while the corresponding form in (6.14) means 'you eat', or 'Eat!'. The major syntactic difference is that *a*-theme forms can occur with overt direct objects, while *u*-theme forms (to the best of my knowledge) do not.

However, the condition that *u-* is licensed in the presence of another Layer 1 affix creates morphological gaps. Repeated attempts to elicit first- and third-person atemporal *u*-theme forms have consistently produced only *a*-theme forms, whereas speakers freely volunteer *u*-theme forms in the second person. It is not clear whether the *a*-theme forms can ambiguously have a valence-reduced reading, or whether the reading is simply not available in those person categories.

Another structural point of note is that in the second-person forms in (6.14), the theme vowel *u-* cooccurs with the second-person prefix *i-*, unlike in the second-person forms in (6.13) where the second-person *i-* precludes the appearance of the theme vowel *a-*. This may relate to the fact that the second-person intransitive *r* intervenes between *i-* and *u-*, which could historically have blocked a vowel-vowel interaction (if that is in fact what gave rise to theme-vowel non-occurrence in *a*-theme second-person forms).

(6.13) Transitive paradigm: theme vowel *a-*

s-a-ty 1-TV-eat	s-a-t-*io*n 1-TV-eat-PL
i-ty 2-eat	i-t-*io*n 2-eat-PL
a-ty TV-eat	a-t-*iu*f TV-eat-3PL
a-t-*io*r TV-eat-INC	

(6.14) "Generic object"-reading paradigm (defective?)

s-a-ty (2;23) 1-TV-eat	s-a-t-*io*n 1-TV-eat-PL
i-r-u-ty 2-2I-TV-eat	i-r-u-t-*io*n 2-2I-TV-eat-PL
a-ty TV-eat	a-t-*iu*f TV-eat-3PL
a-t-*io*r TV-eat-INC	

Despite the absence of the *u*-theme forms for the first, third, and first-inclusive persons in the atemporal, they are available for all persons when a Layer 1 affix such as the subordinate or completive is added. Whereas only the 2nd-person forms in (6.14) have the theme vowel *u*-, all of the forms in (6.16) do. The paradigm in (6.15) shows that the theme vowel *a*- is also available for all these forms, with the concomitant transitive reading. (The palatalization on the completive and first-person subordinate affixes before *u* is due to a regular phonological process; see §2.2.1.)

(6.15) Subordinate paradigm, transitive reading

n-a-ty 1SB-TV-eat	n-a-t-*io*n 1SB-TV-eat-PL
m-e-ty (1;82) SB-2-eat	m-e-t-*io*n (1;82) SB-2-eat-PL
m-a-ty (3;23) SB-TV-eat	m-a-t-*iu*f (3;27) SB-TV-eat-3PL
m-a-t-*io*r SB-TV-eat-INC	

(6.16) Subordinate paradigm, generic-object reading

ñ-u-ty (1;124) 1SB-TV-eat	ñ-u-t-*io*n 1SB-TV-eat-PL
m-e-r-u-ty (3;19) SB-2-2I-TV-eat	m-e-r-u-t-*io*n (1;96) SB-2-2I-TV-eat-PL
m-u-ty SB-TV-eat	m-u-t-*iu*f (1;91) SB-TV-eat-3PL
m-u-t-*io*r (4;25) SB-TV-eat-INC	

(6.17) Generic-object reading: examples

a. Mu-najta naw m-u-jimb-iuf tim.
PL-woman not SB-TV-sweep-3PL yesterday
'The women didn't sweep yesterday.' (1;91)

b. Pe Juan akiup pe Pablo t-a-mb-af m-u-t-iuf.
P Juan with P Pablo CP-TV-go-3PL SB-TV-eat-3PL
'Juan and Pablo went to eat.' (1;90)

A second use of the theme vowel *u-* is with inherently intransitive verbs. With many prefixing intransitives, *u-* rather than *a-* is often used wherever the former is licensed, namely in completive and subordinate forms. Some roots are attested with both *u-* or *a-*, which could have a subtle meaning difference, but I have not yet been able to uncover any. Other intransitive roots are unattested in my data with *u*-theme stems, always taking the theme vowel *a-*; the reasons for this are unknown. I do not know of any intransitive verbs that must take *u-* whenever it is structurally licensed, though there are some that usually do, perhaps for semantic reasons. Issues of obligatoriness or optionality in theme vowel assignment, as well as possible semantic conditions causing different behavior among prefixing intransitives with regard to theme vowels, are an important area for future research.

(6.18) Theme vowel *u-* with prefixing intransitives

a. xiok ty-u-kwik-ius
I CP-TV-laugh-1
'I laughed' (2;25)

b. xiok ty-u-kior-as
I CP-TV-run-1
'I ran.' (4;2)

Relatedly, the theme vowel *u-* is also required in conjunction with the reflexive suffix *-e*, though only in strictly reflexive readings. In reciprocal readings, to my knowledge only *a-* is used. In self-benefactive readings, both theme vowels are used, ostensibly according to whether the verb is transitive or not, or whether an activity reading is intended.

(6.19) Theme vowel *u-* with reflexive

a. Naw ñ-u-xot-ye
not 1SB-TV-hide-RFL
'I didn't hide myself.' (2;125)

b. Ñingion tiol nataxu kambaj kej x-i-n-a-xum-ey-an.
there in old town there 1-FT-1SB-TV-meet-RF-PL
'Allá (en Pueblo Viejo) nos encontramos.' (1;139)

c. par m-a-uñ-e mi-mezcal
to SB-TV-buy-RF POS-mezcal
'in order to buy himself mezcal' (2;154)

d. m-e-r-u-uñ-e [meruñe]
SB-2-2I-TV-buy-RFL
'(that) you (sg.) go shopping' (2;153)

Lastly, *u-* can be used to passivize or impersonalize transitive verbs. It would appear that *u*-theme forms of transitive verbs are ambiguous between activity and passive readings, i.e. it is ambiguous whether it is the subject or the object of the original transitive verb that remains as the sole argument its valence-reduced version. It is also possible, however, that there are interactions with tense/aspect, as many of the passive examples are found in the completive.

An additional point of note is that the theme vowel *u-* is not known to cooccur with the intransitive aspiration morpheme *j-* (§6.4.1). Verbs with this aspiration, which is lexically specified, appear to only ever take the theme vowel *a-*.

(6.20) Passivization with theme vowel *u-*

a. Ty-u-nchum u-mbas.
CP-TV-paint 3POS-front
'It was painted.' (2;146)

b. Ty-u-lojty u-laj pa m-a-jmuly karuñ u-laj.
CP-TV-pierce 3POS-ear to SB-TV-enter jewelry? POS1-ear
'Her ear was pierced for earrings to go in.' (3;30)

c. Ty-u-ndil.il.
CP-TV-turn
'He got sent back' [from the U.S. border] (3;36)

6.1.5 Syllable count, vowel epenthesis, and verb structure

There appears to be a constraint prohibiting affixes in outer layers of the verb from being tautosyllabic with the root. Where tautosyllabicity might otherwise be expected, e.g. a consonantal suffix concatenated with a vowel-final root, a vowel is epenthesized. The suffixes subject to this condition are the Layer 3 mobile affix *s* and the various plural-marking suffixes. Compare the lack of epenthesis in Layer 1 mobile affixes *t* (completive) and *m* (subordinate) in (6.21ab) with the Layer 3 and 4 examples in (6.21cd). Vowel epenthesis in the latter cases cannot be attributed to the normal motivation of cluster avoidance, since the bases are already vowel-final.

(6.21) Syllable creation in Layer 3 and 4 suffixes

a. I-lia-m xi-miajts
FT-complete-SB 1POS1-heart
'I'll remember.' (1;131)

b. Ndro-t u-mbas.
be.lost-CP POS1-front
'It fell apart.' (its form was lost)

c. t-a-la-as
CP-TV-fressen-1
'I gobbled it up.'

d. mi-no-on
POS-husband-PL
'your (pl.) husbands' (3;25)

The Layer 3 mobile affix *s* can be tautosyllabic with the root when it appears as a prefix (6.22a). On the other hand, the Layer 4 progressive prefix *ndyu-* (§6.3.5), the prefixal perfect particle *la* (§6.3.4), and the gerundive particle *ka-* (§6.2.2) are blocked from coalescing with verb-initial vowels as they otherwise do (see paradigms in the respective cross-referenced sections), if that would make the verb word monosyllabic. The original vowel of the prefix or particle is either preserved (6.22bcd), or the verb-initial vowel (if different) is copied into its vowel slot (6.22efg).

(6.22) Syllable preservation in Layer 4 prefixes and prefixal particles

a. t-a-tyey-as
CP-TV-hang-1
'I hung it up/spread it out'

b. dyu-a-ty
PROG-TV-eat
's/he is eating (it)' (1;133)

c. La=a-w a ion.
PF=TV-exit D wind
'The north wind has now come out.' (2;154)

d. Aj ka tiujt ke ka=a-m nday Siwisen.
D D road D G=TV-go toward Juchitán
'This road goes toward Juchitán.' (3;20)

e. Dy-a-a-jch iow wakax.
PROG-V-TV-give water cattle
'He's giving water to the cattle.' (2;118)

f. dy-i-i-ty
PROG-V-2-eat
'you (sg.) are eating (it)' (1;133)

g. L-i=io-m?
PF=V-2-go
'Are you going now?' (1;101)

6.2 Nonfinite verb forms

6.2.1 Subordinate

The subordinate is a verb form that is marked for person and number, but does not carry tense/aspect information. As such it generally cannot be the main verb of an independent clause, with the major exception of negative sentences. It has a wide variety of uses in dependent clauses, and as a base form on which several other tense/aspects paradigms are formed. The subordinate forms of prefixing verbs with the theme vowel *a* and for suffixing verbs are illustrated in (6.23); the paradigm for prefixing verbs with the theme vowel *u* is above in (6.16). The subordinate marker takes the form of a mobile affix *n-* in first (-exclusive) person, and a mobile affix *m-* in all other persons. The affix mobility can be seen in that it is a prefix on the prefixing verbs, but a suffix on the suffixing verbs (except in second-person forms).

(6.23) Subordinate form, prefixing a-themes

n-a-rang (3;24) 1SB-TV-do	n-a-rang-*a*n 1SB-TV-do-PL
m-e-rang SB-2-do	m-e-rang-*a*n SB-2-do-PL
m-a-rang (3;23) SB-TV-do	m-a-rang-*a*f (3;25) SB-TV-do-3PL
m-a-rang-*a*r SB-TV-do-INC	

(6.24) Subordinate forms, suffixing verbs (1;163)

wejk-*ia*-n born-V-1SB	wejk-*ia*-n-u-n born-V-1SB-ITR-PL
m-e-wejk-*ia*-r SB-2-born-V-2ITR	m-e-wejk-*ia*-r-u-n SB-2-born-V-2ITR-ITR-PL
wejk-*ia*-m born-V-SB	wejk-*ia*-m-u-j born-V-SB-ITR-3PL
wejk-*ia*-m-u-r born-V-SB-ITR-INC	wejk-*ia*-m-u-ts born-V-SB-ITR-INC

There is some variation in the second-person subordinate forms of suffixing verbs, which will be discussed in more detail in Chapter 7 but which for descriptive completeness I will foreshadow here. Specifically, the affix sequence *m-e* (Subordinate-2nd Person) can either appear prefixed to the verb root, as in the paradigm shown, or suffixed to it. It is not known whether all suffixing verbs vary freely in this respect, or whether this variation even where it does occur is conditioned in any way by the grammar, but for at least some verbs, speakers have produced both types of forms both spontaneously and in elicitation, and judge them to be equally well-formed.

(6.25) Variation in second-person subordinate forms of *chut-* 'sit'

Prefixed *m-e*	m-e-chut-u-r SB-2-sit-V-2I	m-e-chut-u-r-un SB-2-sit-V-2I-PL
Suffixed *m-e*	chut-u-m-ia-r sit-V-SB-2-2I	chut-u-m-e-r-un sit-V-SB-2-2I-PL

The subordinate is used when negating atemporal (present and/or imperfective) or completive verb forms. When negating the atemporal, the negative particle *ngo* is used, and when negating past events, the negative particle is *naw*, often reduced to *na*.

(6.26) The subordinate in negation

a. Como aj kuchu ñunch <u>ngo m-u-ndiak</u>, <u>ngo m-a-ngoch</u> ñikwej.
as D little boy not SB-TV-speak not SB-TV-answer nothing
'Since the little boy didn't talk, he didn't respond.' (1;136)

b. Xiok <u>ngo wit-io-n</u> tempran.
I not rise-V-1SB early
'I don't get up early.' (1;162)

c. Ñuaf <u>naw m-a-mey-af</u> tapojt.
they not SB-TV-sleep-3PL anoche
'They didn't sleep last night.' (1;91)

The subordinate is used in negative commands with the negative-command particle *dyaja*. As for positive commands, usually atemporal forms are used, but subordinate commands are used in this function as well. Stairs and Hollenbach (1981:325) note for the San Mateo dialect that this elevates the politeness of the command, and the same fact seems to hold in San Francisco. Hortatives use the subordinate exclusively, never the atemporal.

(6.27) Subordinate in commands

a. Dyaja m-e-rang!
don't SB-2-do
'Don't do it! (sg.)' (2;125)

b. Dyaja m-e-rang-an!
don't SB-2-do-PL
'Don't do it! (pl.)' (2;125)

c. M-e-rang favor, i-jaw tiol ndom...
SB-2-make favor 2-see if can
'(Please) do me a favor, see if you can...' (2;2)

d. M-a-mb-ar juntas.
SB-TV-go-INC together
'Let's go together.' (2;14)

Another major use of the subordinate is as what might be called a nonfinite verb form, in various constructions involving chains of verbs, including where the subjects of the main and dependent-clause verbs are distinct.

(6.28) Subordinate in complement clauses

a. <u>A-ndiom m-u-kejch-e m-u-ndok</u>.
TV-want SB-TV-teach-RFL SB-TV-fish
'He wants to learn to fish.' (1;93)

b. <u>S-a-ndiom m-a-rang</u> xa-najta.
1-TV-want SB-TV-make 1POS-woman
'I want her to be my wife.' (3;7)

c. Xuwe mu-naxuy <u>t-a-pey-af m-a-jau-j</u>.
many PL-man CP-TV-arrive-3PL SB-TV-see-3PL
'Many men came to see.' (2;20)

d. Ndo x-i-n-a-m n-a-yak leng s-a-iw.
then 1-FT-1SB-TV-go 1SB-TV-put LOC 1-TV-borrow
'After that I'll go give it back at the place I borrowed it from.' (2;17)

e. I-sa m-a-jngot.
2-tell SB-TV-come
'Tell him to come.' (1;139)

Modal or auxiliary-like words are followed by verbs in the subordinate form. This includes analytic causatives built with the verb 'to give', as well as 'to be able to', 'to be necessary', 'start', 'end', and others.

(6.29) Subordinate with auxiliary verbs

a. A-jch xiok n-a-me.
TV-give me 1SB-TV-sleep
'It gets me to sleep.' (2;15)

b. Xiok andom ñ-u-ndok.
I can 1SB-TV-fish
'I can fish.' (1;94)

c. Ñuaf la pots-o-Ø m-a-nday-iuf u-mbey-ajts.
they PF begin-V-ITR SB-TV-conocer-3PL POS-mouth-INC
'They have begun to learn Huave.'

d. La aim m-a-ndajp a ndix.
PF finish SB-TV-burn D firewood
'The firewood is now done burning.' (2;16)

e. Al ndo-m n-a-ty a kañ t-a-ngojch.ngojch xi-wix.
when end-SB 1SB-TV-eat D sweets CP-TV-sticky.RED 1POS-hand
'When I finished eating the sweets my hands were sticky.' (2;36)

f. Ñutam m-a-xijp anop kaða naty.
necessary SB-TV-bathe one every day
'One needs to bathe every day.' (1;139)

Subordinate forms are commonly used in dependent clauses introduced by subordinating conjunctions of the type surveyed in §5.4.5. Note that in most of these examples, the main clause verb is in the future tense. In (6.30f), the main clause verb is also in the subordinate, perhaps because it is a counterfactual. Rolf Noyer (p.c.) has suggested that the subordinate has some irrealis semantics, which would fit well with many of the uses illustrated in this section. Most other tenses and aspects can occur in subordinate clauses as well, depending on semantic and pragmatic conditions.

(6.30) Subordinate in dependent clauses

a. Wax n-a-xeng-ian aj ke narix ndok, ke x-i-n-a-wañ-ion
when 1SB-TV-raise-PL D D little net there 1-FT-1SB-TV-sacar-PL

a katy loke t-a-kaly tiol a ndok.
D fish REL CP-TV-quedar in D net
'When we (excl.) raise the small net, there we take out the fish that stayed (got caught) in the net.' (2;28)

b. S-a-yaj n-a-j.ñe wax n-a-me tiol a joy.
1-TV-feel ST-TV-good on 1SB-TV-sleep in D hammock
'I feel good when I sleep in the hammock.' (1;100)

c. Tiol m-a-j.ngot al.anop i-chut-u-m a ten an.
if SB-TV-come another FT-sit-V-SB also
'If someone else comes s/he'll sit down too.' (2;9)

d. Al m-a-pe leng k-a-j.laik a princesa...
at SB-TV-arrive where G-TV-be D princess
'When he arrived where the princess was...' (2;25)

e. I-m-e-xuñung biom tiol kamay par m-e-rang mi-najngoy.
FT-SB-2-pile fire in hearth to SB-2-make POS-food
'You'll get a fire together in the hearth to make your food.' (1;122)

f. Pot m-a-m ti plas m-a-uñ piats, pero naw m-a-m.
if.CF SB-TV-go to market SB-TV-buy tortilla but not SB-TV-go
'If she'd gone to market she'd have bought tortillas, but she didn't go.' (1;133)

Subordinate forms are also used in other complement clauses of various types, both those that have and those that lack an overt complementizer. The pair of sentences in (6.31de) illustrates the fact that the subordinate can occur in main clauses, and it is not necessarily in complementary distribution with tense/aspect-marked verb forms. (Returning to the irrealis hypothesis, a question relevant to (6.31e) might be whether the speaker ever actually catches fish with his hands.)

(6.31) Subordinate in various clause types

a. Ngo m-a-j.laik ke n-a-yak.
not SB-TV-be where 1SB-TV-put
'There isn't anywhere (for me) to put it.' (2;13)

b. Aj ka kius ke a-mbik.mbik u-wiol m-a-jaw xiok.
D D dog D TV-wiggle.RED POS-tail SB-TV-see me
'Ese perro mueve la cola cuando me ve.' (1;100)

c. Ngo m-a-j.ñe m-e-j.muly mas tiol a iow ke porke n-a-jal.
not SB-TV-good SB-2-enter much in D water D b/c deep
'It's not good for you to go into that water because it's deep.' (2;10)

d. Xiok s-a-sap a katy akiup xa-ndok.
I 1-TV-catch D fish with 1POS-net
'I catch fish with my *atarraya*.' (1;171)

e. Xiok n-a-sap a katy akiup xi-wix.
I 1SB-TV-catch D fish with 1POS-hand
'I catch fish with my hands.' (1;171)

As will be seen below, subordinate forms also serve as the base for building the perfect, progressive, and durative tenses, though for the perfect and progressive it is only used in transitive verbs, while the intransitives are built on atemporal forms. Stairs and Hollenbach (1981:324) note a similar transitivity-based alternation in the "go to do X" and analytic-causative (see §6.4.4) constructions in the San Mateo del Mar dialect, where complement-clause verbs are in the subordinate if transitive and in the atemporal if transitive. In the San Francisco dialect I have not noticed any such systematic alternation, although the following example shows that atemporal forms are possible in at least some complement clauses.

(6.32) T-a-mb-as-an s-a-ndok-on.
CP-TV-go-1-PL 1-TV-fish-PL
'We (excl.) went to fish.' (1;164)

6.2.2 Gerunds

The other nonfinite-like verb form commonly occurring in dependent clauses (as well as some independent clauses) is what I will call gerunds, which are formed with a prefix *k-*. Gerunds do not appear to contain tense/aspect information. Morphologically, the notable thing about them is that they can only occur in the absence of a dedicated person marker, namely in the third-person singular and plural and in the first-inclusive. The *k-* prefix cannot cooccur with the first, first exclusive or second person. Under paradigmatic elicitation of verbs in contexts where gerunds are found (6.33ad), the first- and second-person forms are given in their atemporal forms (6.33bce).

(6.33) Gerunds (3rd and 1st inclusive person only)

a. Xa-tichuy n-a-j.ñe k-a-j.laik.
1POS-uncle ST-TV-good G-TV-be
'My uncle is well.' (2;27)

b. T-a-sa-as n-a-j.ñe s-a-j.laik.
CP-TV-tell-1 ST-TV-good 1-TV-be
'I told (him/her) I was well.' (2;27)

c. N-a-j.ñe i-j.laik?
ST-TV-good 2-be
'Are you well?' (2;58)

d. La ndo-Ø k-a-xijp-ior.
PF finish-ITR G-TV-bathe-INC
'We (incl.) are now done bathing.' (1;92)

e. La ndo-Ø s-a-xijp.
PF finish-ITR 1-TV-bathe
'I am now done bathing.' (1;92)

Evidence for nominal properties of gerunds includes that they are sometimes translated by speakers with deverbal Spanish forms, and also that their syntactic distribution overlaps with that of nouns. For example, (6.34b) has a gerund instead of a nominal direct object, and the speaker glosses it as a nominal relative clause. To contextualize the root -*koy* in (6.34c), it is additionally attested as a verb *a-koy* ‘hurts’ and as a noun *ñukoy* ‘pain’. The line between productive gerunds with nominal properties and lexicalized nouns beginning with *k-* like in §5.3.1 is not clear, but the following examples seem to be on the productive end of the spectrum.

(6.34) Nominal properties of gerunds

a. L-a-ngey-ach k-a-yom n-a-ðam ndyuik.
PF-TV-hear-PASS G-TV-bellow ST-TV-big ocean
‘The bellowing of the Pacific (Ocean) is already audible.’ (2;106)

b. T-a-jir-as kuñ n-a-jants xi-wix
CP-TV-have-1 what 1SB-TV-wash 1POS-hand

par t-a-w k-a-ngojch.ngojch.
to CP-TV-exit G-TV -sticky.RED
‘I had sthg. for washing my hands “para que salió el que pegapega”’(2;36)

c. X-i-n-a-ty anek saj par m-a-ndoijk <u>k-a-koy</u> xi-mal.
1-FT-1SB-TV-eat one medicine to SB-TV-cut G-TV -hurt 1POS-head
‘I will take a medicine to relieve the pain in my head.’ (2;37)

Another translation of gerunds that has been offered by speakers is ‘the way in which [verb]’. Gerunds, even where they are the main verb in the sentence, often cooccur with adverbials and adverbial phrases such as in (6.35a).

(6.35) Gerunds as main verbs with adverbial and other modifiers

a. <u>Tiol a poy</u> k-a-jañ a piats.
in D oven G-TV-ripen D tortilla
‘The tortillas cook in the oven.’ (1;122)

b. <u>Pojch-io-n</u> k-a-j.laik a jely.
spread-V-ST G-TV-be D clothes
‘The clothes are smoothly spread out.’ (3;66)

c. Aj ka buey <u>xu mi tamanta</u> k-a-not a karret.
D D mule very MI slow G-TV-pull D cart
‘This mule draws the cart very slowly.’ (1;126)

Along similar lines, there are a couple of function words that are frequently accompanied by gerunds, for example *xu/xuwe/xu mi* 'much, a lot', and *leng* and *ñing* (seemingly interchangeable words meaning 'the place where X').

(6.36) Gerunds with *xu(we)* 'very' and *leng* 'the place where'

a. Xuwe k-a-jior sats.
very G-TV-have thorn
'It has a lot of thorns.' (1;111)

b. Xu ka a-w xa-nalily wax k-a-yak ñurrar.
very G TV-exit 1POS-sweat when G-TV-put heat
'I sweat a lot when it is hot.' (1;139)

c. Xuwe k-a-nay xi-mbiom.
very G-TV-get.dirty 1POS1-home
'My house is very dirty.' (1;123)

d. Xu ka mujke.
very G far
'It is very far.' (2;72)

e. T-a-ngot-os al.anom vuelt leng k-a-j.laik a ñu.
CP-TV-come-1 another time where G-TV-be D he
'I came once again to where he was.' (080609-Be_26a)

f. leng k-a-mbul-iuf a orr t-a-j.ngot a wakax
where G-TV-burn-3PL D shell CP-TV-come D cattle
'Where they burn(ed) the shells, the cattle came.' (A Lom)

Another common context for gerunds is in questions containing interrogative words, which might again qualify as some kind of modifier context.

(6.37) Gerunds with interrogative words

a. Ke k-a-j.laik a korraly?
where G-TV-be D corral
'Where is the corral?' (1;100)

b. Kuñ k-a-mal-af a najta ke?
what G-TV-carry-3PL D woman D
'What are those women carrying (on their heads)? (2;64)

c. Ngoy k-a-j.miok mi-ñungux naty mi-Dios?
when G-TV-descend POS-festival day POS-saint
'When does the festival of your saint fall?' (1;164)

A notable alternation is that statives and other adjectives that start with *n*- obligatorily change to gerunds when preceded by *xu*. Even disyllabic adjectives like in (6.36d) must take a particle, either *ka* or *me*, in order to be preceded by *xu.* The alternations between a *k*- prefix and a *ka* particle, including in examples like (6.36b), should be studied further (and also perhaps in conjunction with similar alternations in the perfect and progressive prefixes in §6.3.4 and §6.3.5). Unlike *xu* 'very', on the other hand, *leng* and *ñing* head dependent clauses that can more freely take verbs in various tenses and aspects, even though gerunds seem impressionistically to be the most common forms used in this context.

Although the nominal properties of gerunds fit with most if not all of the aforementioned contexts, the fact that their distribution overlaps with subordinate and atemporal forms means that a full account of them eludes us for the time being. The extent of and conditions on this overlap will obviously be crucial points to investigate in future research on the morphosyntactic properties of *k*-, in particular the conditions under which gerunds can occur as main-clause verbs.

Assorted examples are shown in (6.38). For example, gerunds are widely used with subordinating conjunctions, especially *wax*. It is not known whether they can occur with all subordinating conjunctions the way the subordinate can.

(6.38) Gerund usage examples

a. Wax k-a-j.tip a avion ot ki ngo m-a-ta sentir n-a-paty.e mi-kwerpo?
on G-TV-rise D plane as this not SB-TV-do feel ST-TV-bad POS-body
'When the plane rises like that, doesn't it feel bad in your body?' (2;105)

b. Ndo-Ø an k-a-pir-ach a us t-a-joty.
finish-ITR just G-TV-sow-PASS D maize CP-TV-rain
'As soon as the maize was sowed it rained.' (1;110)

c. La ndo-Ø m-a-jch k-a-ngañu a padrino.
PF finish SB-TV-give G-TV-drink D padrino
'S/he has now given the *padrino* something to drink.' (2;41)

d. Ñuaf i-m-a-lomb-och-iuf k-a-jionts-af.
they FT-SB-TV-stop-CAUS-3PL G-TV-cry-3PL
'They will stop crying.' (1;103)

e. Al ke miaw.an loke ñu k-a-ndiom.
at there all.just REL he G-TV-want
'There, there was everything that he wanted.' (2;24)

A notable apparent gap in the gerund paradigm (besides first and second person) is that gerunds do not seem to exist for suffixing verbs. In at least some contexts where gerunds would be expected, the atemporal is found.

(6.39) Suffixing verbs: no gerunds

a. <u>Xu ndojch-io-w</u> mi-iow a kañ.
very thick-V-ITR POS-water D dulce
'The syrup of the candied fruit is very thick.' (2;36)

b. <u>Ñing piu-f</u> m-a-xojt wax a(l)=m-a-pak.
where lie.DM-ITR SB-TV-rest when DUR=SB-TV-live
'where she lay resting when she was alive' (4;24)

6.3 Tense and Aspect Categories

Huave has two simple tense/aspect categories formed with affixes consisting of a single segment (completive, stative), and four compound ones that are built either on subordinate forms (future, durative), or alternate between being built on subordinate and atemporal forms depending on the valence of the verb (perfect, progressive). The latter group demonstrates that Huave has a sort of split intransitivity in the verbal system as a whole: the prefixing- vs. suffixing-verb distinction puts a divide roughly between unergatives and unaccusatives (actives and statives), whereas the compound tenses and aspects make their divide between transitives and intransitives.

6.3.1 Atemporal

The atemporal paradigms have already been given, so I will use this subsection to briefly illustrate some uses of atemporal forms. They are used in many of the same contexts as the English present tense: to talk about habitual actions, general facts not bound to a particular point in time, and (somewhat undermining the label "atemporal") a limited number of states and actions in the present, such as (6.40a). Actions in the present are more typically expressed with the progressive (§6.3.5).

(6.40) Usage of the atemporal: Present/habitual/ongoing/general

a. Al.anek s-a-ndiom n-a-tañ iok mi.nge.[2]
another 1-TV-want 1SB-TV-ask you hear
'I want to ask you another thing.' (2;148)

b. Miaw.an a naty s-a-mb-an Sawisen
all D day 1-TV-go-PL Juchitán
'Every day we (excl.) go to Juchitán.' (1;169)

c. Sa-puy a-rang ñutiol.
1POS2-nuera TV-make tamal
'My daughter-in-law makes tamales.' (2;114)

d. Ñu a-ta vivir al.anek kambaj.
she TV-do live another town
'S/he lives in another town.' (2;123)

e. Ngo m-u-koy, a-j.lich an.
not SB-TV-hurt TV-fall just
'It doesn't hurt, it just falls out.' (talking about losing teeth) (2;148)

f. A-lyu(y) a iot wax xu k-a-joty.
TV-soft.DM D earth when much G-TV-rain
'The earth gets soft when it rains a lot.' (2;129)

[2] The idiom *-tañ minge* means 'ask a question'; its morphological structure is somewhat unclear.

Atemporal forms are also used for habitual and/or ongoing actions in the past (6.41). Second-person atemporal forms are also used for positive commands (6.42).

(6.41) Past usages of the atemporal

a. Ngo m-a-j.laik tortilleria, <u>s-a-nchil-an</u>.
not SB-TV-be tortillería 1-TV-grind-PL
'There was no tortilleria, we ground [the corn].' (2;116)

b. Miaw.an ñipinaj <u>a-ndiak</u> kej i-m-a-kaly a wiujt pero t-a-mong.
all people TV-speak there FT-SB-TV-stay D sand but CP-TV-pass
'All the people said the sand would stay there, but it passed through.' (AL)

c. Mas antes xinan s-a-mb-an Siwisen.
more before we.EX 1-TV-go-PL Juchitán
'Back in the day, we went to Juchitán' (3;22)

(6.42) Atemporal in commands

a. I-ndiak nalyeng, diaja m-e-tsoj xi-mal.
2-speak true don't SB-2-play 1POS-head
'Tell the truth, don't deceive me.' (2;151)

b. I-ujch tyukay.
2-move little
'Move over a little.'

Some uses of atemporals in constructions where they complement or modify other verbs are shown in (6.43). In (6.43c), the nominal-like use is an example parallel to those in (6.34); due to the cooccurrence restriction between gerunds and dedicated (i.e. non-portmanteau) person-marking, the atemporal is used here instead.

(6.43) Non-main-verb uses of atemporal

a. T-a-mong <u>a-rrok</u>.
CP-TV-pass TV-swim
'He passed by swimming.'

b. Xiok <u>ndil-i-w-e</u> s-a-nday.
I turn-V-ITR-RF 1-TV-aware
'I am disoriented.' (3;68)

c. T-a-poly s-a-me a piang.
CP-TV-break 1-TV-sleep D mosquito
'The mosquitos woke me up.'(1;169)

The atemporal is negated by preposing *ngo* to the subordinate form of the verb, as shown in (6.26ab).

6.3.2 Completive

What I will call the completive aspect is marked by the mobile affix *t*. Following are the completive paradigms for prefixing *a*-themes (6.44); prefixing *u*- themes, in which phonologically regular palatalization of *t* is found (6.45); and suffixing verbs (6.46). The completive affix *t* is prefixal in prefixing verbs and in second-person forms of suffixing verbs; it is suffixal in all other forms of suffixing verbs. (See Chapter 7 for analysis of the principles behind mobile affix placement.)

(6.44) Completive paradigm, prefixing *a*-themes

t-a-rang-*as* (1;92) CP-TV-do-1	t-a-rang-*as*-*an* (1;129) CP-TV-do-1-PL
t-e-rang (2;134) CP-2-do	t-e-rang-*an* (1;129) CP-2-do-PL
t-a-rang (1;136) CP-TV-do	t-a-rang-*af* (1;92) CP-TV-do-3PL
t-a-rang-*ar* (1;129) CP-TV-do-INC	

(6.45) Completive paradigm, prefixing *u*-themes

ty-u-t-ius (1;95) CP-TV-eat-1	ty-u-t-*is*-*an* (1;96) CP-TV-eat-1-PL
t-e-r-u-ty (1;95) CP-2-2I-TV-eat	t-e-r-u-t-*ion* (1;96) CP-2-2I-TV-eat-PL
ty-u-ty (1;95) CP-TV-eat	ty-u-t-*iuf* (1;96) CP-TV-eat-3PL
ty-u-t-*ior** CP-TV-eat-INC	

In elicitation of completive paradigms for suffixing verbs, the speaker consulted gave either first-exclusive or first-inclusive minimal verbs forms to match the first-inclusive multiple pronoun *kunajts*, judging both to be acceptable (1;163).

(6.46) Completive paradigm, suffixing verbs (1;161)

wit-*io*-t-u-s rise-V-CP-ITR-1	wit-*io*-t-u-s-*u*n rise-V-CP-ITR-1-PL
t-e-wit-*io*-r CP-2-rise-V-2I	t-e-wit-*io*-r-u-n CP-2-rise-V-2I-ITR-PL
wit-*io*-t rise-V-CP	wit-*io*-t-u-j rise-V-CP-ITR-3PL
wit-*io*-t-u-r* rise-V-CP-ITR-INC	

Completive verb forms are typically translated into Spanish as preterites. Almost always, the completive is used with events that occurred in the past. Many are events that occurred instantaneously at a specific point in time, or over a short period of time.

(6.47) Preterite uses of completive

a. T-a-aim-ius tapojt al n-a-me.
CP-TV-dream-1 anoche at 1SB-TV-sleep
'I dreamed last night as I was sleeping.' (3;103)

b. T-a-ndiom-as n-a-lyej a paliom, pero naw ndo-m.
CP-TV-want-1 1SB-TV-open D door but not can-SB
'I wanted to open the door, but I couldn't.' (1;133)

c. Chup-io-t a xur de iow.
fill-V-ITR D pot of water
'The pot filled with water.' (2;2)

d. T-a-jants-as xa-jely tim.
CP-TV-wash-1 1POS-clothes yesterday
'I washed my clothes yesterday.' (1;130)

e. Tiol a lunes t-ia-m?
in D Monday CP-2-go
'You went on Monday?' (1;124)

f. T-a-li.j.ch-ius i chepel-ia-t xa-roðíya.
CP-TV-fall-1 and scrape-V-CP 1POS-knee
'I fell and my knee got scraped up.' (2;104)

Another use of completive forms is in contexts where they refer to ongoing or habitual states and actions that are in the past, but not bound to any one specific point in time in the past.

(6.48) Past-ongoing uses of completive

a. Wax t-a-rang-as mas mu.na.ngich t-a-jiong-as.
when CP-TV-do-1 more youth CP-TV-dance-1
'When I was younger I danced.' (2;108)

b. Anom vuelt t-a-j.laik anop tunant xu k-a-ndiom nax.
one time CP-TV-be one rascal much G-TV-want girl
'Once (upon a time) there was a rascal who really liked girls.' (1;140)

The completive is found in subordinate clauses, possibly only used when the action referred to took place (as opposed to being a potential action or state of affairs).

(6.49) Completive in subordinate clauses

a. Wax t-e-j.ngot ngo m-a-j.laik corriða.
when CP-2-come not SB-TV-be route
'When you came there wasn't a route.' (2;104)

b. par t-a-j.ñe xi-wix
to CP-TV-good 1POS1-hand
'in order that my hand would heal' (2;136)

Completive forms are also attested in non-past contexts. I have only a few examples of these usages so far, but they seem to warrant the characterization of these verb forms as an aspect rather than a tense.

(6.50) Non-past uses of completive

a. X-i-n-a-chujch i-mbe. Ndo-Ø t-e-chujch xi-mbe.
1-FT-1SB-TV-kiss 2POS1-mouth finish-ITR CP-2-kiss 1POS1-mouth
'I will kiss you. Then, you will kiss me' (2;39)

b. Piaj-t-u-s.
lie-CP-ITR-1
'I lie down' (context: "after you leave today, I will...") (3;48)

The completive is negated by preposing *na(w)* to the subordinate form of the verb, as shown in (6.26c). Another attested but more marginal way of negating the completive is to prepose the particle sequence *ngo me* directly to the completive form. This *ngo me* can be preposed to a wide variety of words (nouns, verbs, etc.) to mean '(is) not X'. It is likely that it has different semantics from *na(w)* + Subordinate.

(6.51) Negation of the completive

a. Na(w) n-a-kejch-iaw u-mbey-ajts.
not 1SB-TV-teach-3PL POS1-mouth-INC
'I didn't teach them Huave.' (3;19)

b. Ngo me t-a-jints-as.
not MI CP-TV-cry-1
'I didn't cry.' (2;135)

6.3.3 Future

The future is formed by taking the subordinate form of the verb and adding the future prefix *i-*. The first person (exclusive) forms further append the first-person marker *x-* (the palatal allomorph of *s-* before a front vowel). The prefixal vs. suffixal positions of mobile affixes are the same as in the subordinate.

(6.52) Future paradigm, prefixing verb (1;174)

x-i-n-a-jch 1-FT-1SB-TV-give	x-i-n-a-jch-*io*n 1-FT-1SB-TV-give-PL
i-m-e-jch FT-SB-2-give	i-m-e-jch-*io*n FT-SB-2-give-PL
i-m-a-jch FT-SB-TV-give	i-m-a-jch-*io*w FT-SB-TV-give-3PL
i-m-a-jch-*io*r FT-SB-TV-give-INC	

(6.53) Future paradigm, suffixing verb (1;161)

x-i-wit-*io*-n 1-FT-rise-V-1SB	x-i-wit-*io*-n-u-n 1-FT-rise-V-1SB-ITR-PL
i-m-e-wit-*io*-r FT-SB-2-rise-V-2I	i-m-e-wit-*io*-r-u-n FT-SB-2-rise-V-2I-ITR-PL
i-wit-*io*-m FT-rise-V-SB	i-wit-*io*-m-u-j FT-rise-V-SB-ITR-3PL
i-wit-*io*-m-u-r FT-rise-V-SB-ITR-2I	

The future is typically used to talk about events that will occur at some later point in time than the moment of utterance. The future can also be used to talk about events that are at a later point in time relative to a time other than the actual moment of speaking; one example along these lines is (6.54e), where the speaker is talking about how she used to prepare for long trips (see also (6.41b)).

(6.54) Usages of the future

a. I-m-a-rang n-a-uly.
FT-SB-TV-do ST-TV-difficult
'It's going to be difficult.' (1;157)

b. Iok i-m-ia-m m-e-r-u-ndok kana ungius?
you FT-SB-2-go SB-2-2I-TV-fish now night
'Are you going to go fishing tonight?' (1;98)

c. Uxup x-i-wit-io-n rra-w an.
tomorrow 1-FT-rise-V-1SB light-ITR just
'Tomorrow I'll get up early (in the morning).' (1;113)

d. X-i-n-a-mul-ich a baston ti-u-lyej a mesa.
1-FT-1SB-TV-enter-CAUS D cane LOC-POS1-foot D table
'I'm going to put the cane under the table.' (3;57)

e. Antes pues, x-i-n-a-rang piats.
before well 1-FT-1SB-TV-maketortilla
'Before [I went], I would have to make tortillas.' (060131-Ep2)

f. Uxup x-i-ñ-u-jants.
tomorrow 1-FT-1SB-TV-wash
'Tomorrow I'll do the wash.' (1;123)

Negation of future events is typically the same as negation of the atemporal/present, that is to say the negative particle *ngo* + the subordinate form. However, *ngo me* can also be preposed directly to the future form.

(6.55) Negation of the future

a. Uxup ngo m-e-j.ngot.
tomorrow not SB-2-come
'You won't come tomorrow.'

b. X-i-chiu-n an. Ngo me x-i-ñ-u-ndiak.
1-FT-calm-1SB just not MI 1-FT-1SB-TV-speak
'I'll be quiet. I won't talk.' (3;30)

6.3.4 Perfect

There is a tense/aspect category formed with a preposed particle *la*, which I tentatively term the "perfect." It is uniformly translated with the Spanish *ya* 'already' and often refers to events in the recent past or other past events that have some relevance to the present. It is also used of present states and actions that are emphasized as being of recent origin, i.e. not being the case in the past. *La* can occur as an independent word meaning 'already': although it would normally occur with a verb, a question posed in the perfect can be answered affirmatively with "*La*" (1;150).

For transitive verbs, *la* is preposed to the subordinate form of the verb.

(6.56) Perfect paradigm, prefixing transitive verb

la=n-a-rang PF=1SB-TV-do	la=n-a-rang-*a*n PF=1SB-TV-do-PL
la=m-e-rang PF=SB-2-do	la=m-e-rang-*a*n PF=SB-2-do-PL
la=m-a-rang PF=SB-TV-do	la=m-a-rang-*a*f PF=SB-TV-do-3PL
la=m-a-rang-*a*r PF=SB-TV-do-INC	

(6.57) Perfect (prefixing transitives)

a. La m-e-mut?
PF SB-2-write
'Have you written it?' (asked spontaneously during elicitation) (1;83)

b. La m-a-sap xiok a joj.
PF SB-TV-catch I D cough
'I've caught a cough.' (lit. 'cough has caught me') (1;160)

c. La m-a-lyejk-iar a iom.
PF SB-TV-open-INC D house
'We (incl.) have opened the door.' (1;92)

d. La m-e-yajk a tiujt.
PF SB-2-feel D road
'You now know the way.'(2;71)

On the other hand, with intransitive verbs, *la* is preposed to the atemporal form. This is true both of prefixing intransitives and suffixing intransitives. *La* is often used with inchoatives to indicate that change of state has taken place. Note the vowel coalescence with the vowel-initial bases in the second, third, and first-inclusive persons.

(6.58) Perfect paradigm, prefixing intransitive

la=s-a-pe (1;61) PF=1-TV-arrive	la=s-a-pey-*a*n (1;91) PF=1-TV-arrive-PL
l=i-pe (2;91) PF=2-arrive	l=i-pey-*a*n* PF=2-arrive-PL
l=a-pe (2;141) PF=TV-arrive	l=a-pey-*a*f (1;85) PF=TV-arrive-3PL
l=a-pey-*a*r (1;91) PF=TV-arrive-INC	

The following are some examples of the perfect with prefixing intransitives. Note (6.59c), which is a passivized form, and (6.59d), which is a reflexive. Example (6.59e) is notable because it refers to an event that the speaker (incorrectly) imagined would have taken place by a point in the future, so it shows that the moment of actual speaking is not the only temporal reference point with respect to which the perfect is used. Note the form in (6.59) where *la* does not show coalescence with the theme vowel, apparently due to minimality effects (§6.1.5).

(6.59) Perfect (prefixing intransitives)

a. Pal-a-t anek kaf, la a-m pa ajkiaw.
close-V-CP one month PF TV-go for two
'One month is complete, it's now going towards two.' (3;22)

b. Wax l-a-jañ, aj ki nawety.
when PF-TV-ripen D D fragrant
'When it's cooked, it smells really good.' (3;56)

c. L-a-t-iran xi-laik.
PF-TV-eat-PASS 1POS1-tooth
'I've gotten a cavity.' (3;73)

d. L-a-xot-ey-af.
PF-TV-hide-RF-3PL
'They have now hidden themselves.' (4;36)

e. La s-a-ndyu
PF 1-TV-die
'I will have died [by the next time you come here].' (1;147)

Suffixing intransitives, like prefixing intransitives, prepose *la* to the atemporal form of the verb.

(6.60) Perfect paradigm, suffixing intransitive (1;162)

la=wit-*io*-u-s PF=rise-V-ITR-1	la=wit-*io*-u-s-*u*n PF=rise-V-ITR-1-PL
l=i-wit-*io*-r PF=2-rise-V-2ITR	l=i-wit-*io*-r-u-n PF=2-rise-V-2ITR-ITR-PL
la=wit-*io*-w PF=rise-V-ITR	la=wit-*io*-u-j PF=rise-V-ITR-3PL
la=wit-*io*-u-r PF=rise-V-ITR-INC	

(6.61) Perfect (suffixing intransitives)

a. La mbajk-a-u-j.
PF separate-V-ITR-3PL
'(We came together, and) now we have separated.' (3;29)

b. La pots-o-Ø k-a-ntsep a naxiol.
PF begin-V-ITR G-TV-sprout D milpa
'The milpa has begun to sprout.' (3;56)

c. La lonch-io-w u-laik.
PF loosen-V-ITR POS1-tooth
'His/her tooth has become loose.' (3;73)

There are a few variants on the paradigms as shown. Some speakers, instead of *la*, prepose *lay* to the main verb forms. Given that final glide deletion in connected speech is attested elsewhere (§2.3.2), it is reasonable to think that *lay* is an older form and *la* is a reduced form. It is probably related to *tilay* 'earlier today', which is decomposable into the locative proclitic *ti-* and a root *lay*, which if it had the more general meaning of recent past, would make sense both in the perfect tense and in *tilay*.

Another variation from the conjugation tables as shown is that there is not always coalescence between *la* and an initial second-person prefix *i-*. Whether this is a lack of coalescence or simply the reflex of *lay* before *i-* is not known; in other words, it is not known whether there is a difference between *la-i-* and *lay-i-* (cf. §2.2.6). Finally, (6.62c) is clearly pronounced as two syllables, although the morphological breakdown only justifies one instance of the prefix *i-*. This last example is probably due to minimality conditions (§6.1.5).

(6.62) Variations of the perfect

a. Lay n-a-xum al.anop.
PF 1SB-TV-find another
'I have now found another [person].' (4;47)

b. la i-pe
PF 2-arrive
'You've arrived.'

c. l-i=io-m (*l-io-m)
PF-V-2-go
'Are you going now?' (1;101)

Intransitive verbs can never form perfects with *la* plus the subordinate; such forms are judged ungrammatical by speakers (6.63a). However, some transitive verbs can optionally form perfects with atemporal forms. This possibility seems limited to some common Verb + Object collocations where the entire VP could be interpreted as having an activity reading, rather than a reading where the transitive verb acts on its object. Examples include the idioms *-yak ñurrar* 'be hot (weather)' (lit. 'put heat'), which is shown in (6.63b) with a subordinate base but in (6.63c) with an atemporal one. See also §6.3.5 on a similar but more productive pattern in the progressive aspect.

(6.63) Noncanonical uses of atemporal/subordinate base forms

a. * la=m-a-xojt
*PF=SB-TV-rest
Intended meaning: 'S/he has rested.' (4;36)

b. La=m-a-yak ñu.rrar.
PF=SB-TV-put heat
'It's hot (outside).' (2;92)

c. Wax l-a-yak xuwe ñu.rrar xi-lyej a-ngojch-e
when PF-TV-put much heat 1POS1-foot TV-sticky-RF
'When it's very hot my feet get sticky.' (4;36)

A frequent way of expressing recent past meanings, which overlap with the perfect, is auxiliary-like usage of *ndo-* 'finish, complete' in a construction *la ndo* + Verb. The verbs in this construction seem to follow the pattern of subordinates for transitives, and atemporals (actually gerunds, as revealed by third-person tokens) for intransitives and activities. However, the range of verb forms that can appear in this construction has not been fully investigated and remains a topic for future research. I note that the arguably deverbal forms may indicate a parallel to the *la ndo* + *a* + Noun construction, which means '(Noun) has ended' (3;63).

(6.64) La ndo + Verb construction

a. La ndo-Ø n-a-mbax, l-a-kaly n-a-j.ñe.
PF finish-ITR 1SB-TV-untangle PF-TV-stay ST-TV-good
'I've now untangled it, it's become okay.' (3;29)

b. La ndo-Ø m-a-lojty u-laj(k).
PF finish-ITR SB-TV-pierce POS1-ear
'She has pierced her ears.' (3;61)

c. Wax la ndo-Ø k-a-t-iuf i-m-a-jants a pulat.
when PF finish-ITR G-TV-eat-3PL FT-SB-TV-wash D plate
'When they are done eating she'll wash the plates.' (3;23)

d. La ndo-Ø s-a-ngañu kafe.
PF finish-ITR 1-TV-drink coffee
'I've already eaten breakfast.'(3;15)

As far as negation, there are two types to discuss. The first is the negation with the meaning of 'not yet'. This is accomplished with the particle sequence *ngo ñe* plus the subordinate form of the verb. Phrasal stress falls on *ñe*; since *ngo* is unstressed, it usually sounds more like *ngu* due to vowel reduction. Optionally, *toðovi* 'still, yet' is appended as an adverb.

(6.65) "Has not (verbed)" construction

a. Ngo ñe m-a-sap a ñiat.
not ÑE SB-TV-catch D year
'It hasn't been a year yet.' (2;104)

b. Ngo ñe m-ia-m ti kambaj mi-mam mi-tyety?
not ÑE SB-2-go in town POS-mother POS-father
'You haven't been to the town of your mother and father?' (2;104)

c. Ngo ñe m-a-ndyu toðovi.
not ÑE SB-TV-die still
'It (the fish) hasn't died yet.' (2;62)

The other type of perfect negation has the meaning 'not anymore', similar to Spanish *ya no* (word-for-word 'already not', but meaning 'not anymore'). This type of negation is constructed with *la* + *ngo* + the subordinate, or even *la* plus the particle sequence *ngo me* plus another verb form. The fact that *ngo* can intervene between *la* and the main verb is evidence that *la* is more clitic- (or particle) than affix-like.

(6.66) "Not anymore" construction

a. La ngo m-a-tiots ndil-i-m-e ti mi-iot.
PF not SB-TV-think turn-V-SB-RF to POS-land
'He no longer thinks of returning to his country.' (3;61)

b. La ngo m-a-rra n-a-j.ñe.
PF not SB-TV-shine ST-TV-good
'It doesn't shine much anymore.' (3;79)

c. La chiuj-u-s. La ngo me ndyu-s-a-ndiak.
PF calm-ITR-1 PF not MI PROG-1-TV-speak
'I've quieted down. I'm not talking anymore.' (3;30)

6.3.5 Progressive

The progressive is used to talk about ongoing actions, similar to English "is/was X-ing." Like the perfect, it shows a split between transitives, which are built on subordinate verb forms, and intransitives (both prefixing and suffixing), which are built on atemporal forms. The progressive is formed with a Layer 4 prefix *(n)dyu-*. The prenasalization is not contrastive and is a matter of phonetic variation, though with this particular morpheme, non-prenasalized tokens are more common.

The paradigm for transitive verbs is shown in (6.67), together with some examples in context in (6.68).

(6.67) Progressive paradigm for transitive verbs

dyu-n-a-rang PROG-1SB-TV-do	dyu-n-a-rang-an PROG-1SB-TV-do-PL
dyu-m-e-rang (1;54) PROG-SB-2-do	dyu-m-e-rang-an PROG-SB-2-do-PL
dyu-m-a-rang PROG-SB-TV-do	dyu-m-a-rang-af PROG-SB-TV-do-3PL
dyu-m-a-rang-ar PROG-SB-TV-do-INC	

(6.68) Progressives of transitive verbs

a. Dyu-n-a-kojch.
PROG-1SB-TV-cut
'I'm cutting (it).' (2;122)

b. Dyu-n-a-tsants a iow para n-a-rang kafe.
PROG-1SB-TV-heat D water for 1SB-TV-make coffee
'I'm heating water to make coffee.' (3;24)

c. Kuñ dyu-m-e-rang?
what PROG-SB-2-do
'What are you doing?' (1;54)

d. Dyu-m-a-jing-ajch ñu a n.a.kiñ.
PROG-SB-TV-dance-CAUS him D cold
'The cold is making him tremble.' (2;151)

The progressive paradigm for prefixing intransitive verbs, consisting of *(n)dyu-* plus atemporal forms, is shown in (6.69). Another parallel to the formation of the perfect is the vowel coalescence that is seen in the second, third, and first-inclusive persons, whereby the prefix vowel is deleted and the base-initial vowel preserved. Coalescence does not happen in the third-person singular *dyu-a-ty* of (6.69), but this seems to be a minimality effect that happens only with single-consonant roots so that the output will be at least disyllabic; it is observed also in the form in (6.70b). Elsewhere, as shown in other examples in (6.70), vowel coalescence in the third-person singular is robust.

(6.69) Progressive paradigm for prefixing intransitives (1;133)

dyu-s-a-ty PROG-1-TV-eat	dyu-s-a-t-ion PROG-1-TV-eat-PL
dy-i-r-u-ty PROG-2-2I-TV-eat	dy-i-r-u-t-ion* PROG-2-2I-TV-eat-PL
dyu-a-ty PROG-TV-eat	dy-a-t-iuf PROG-TV-eat-3PL
dy-a-t-ior PROG-TV-eat-INC	

Following are some examples of progressive forms of prefixing intransitive verbs. The forms in (6.70de) have transitive roots, but with valence-reducing derivational morphology added, and they are thus relegated to the intransitive category. This is particularly noteworthy in (6.70e), which takes the reflexive suffix to form a reciprocal, and has the intransitive pattern despite the fact that the reciprocal meaning might be seen as not necessarily intransitive.

(6.70) Progressives of prefixing intransitives

a. Dy-a-j.kay xuwe.
PROG-TV-get.angry much
'S/he is getting very angry.' (2;77)

b. Dyu-a-w mi-na.lily.
PROG-TV-exit POS-sweat
'S/he is sweating.' (2;13)
(cf. Dya-a-w afuer. 'Está saliendo afuera.', 1;139))

c. Dy-a-jay-iuf a so tiol a kambaj.
PROG-TV-walk-3PL D pig in D town
'The pigs are walking around town.' (2;45)

d. leng dy-a-rang-ach naj.iot
where PROG-TV-do-PASS work
'where work was being done' (2;142)

e. ndy-a-kwet-ey-af
PROG-TV-leave-RF-3PL
'They are leaving each other.' (2;13)

It is quite common for progressives of transitive roots to be formed on the atemporal, which gives a detransitivized reading. The detransitivized "activity" reading with atemporal base forms in (6.71a) can be contrasted with the transitive reading with subordinate base forms in (6.71b). One circumstantial piece of evidence supporting this hypothesis is that progressives are never (to my knowledge) formed with *u*-theme subordinates, in contrast to e.g. the future, which does cooccur with *u*-thematic stems to forms activity readings. Although atemporal-based progressives of transitive verbs are found with overt direct objects, it is possible that these behave syntactically more like incorporated nouns than as objects. That is, the verbs in (6.71c) are tortilla-making and cheese-making, rather than simply "making." Notable in this example is the lack of a article (determiner, specifier) on the apparent object; my hypothesis predicts that atemporal-based perfects may be ungrammatical with specified objects. Meanwhile, intransitive verbs built on subordinate forms are simply ungrammatical (6.71de).

(6.71) Progressive: Activity readings

a. Dy-i-r-u-ty pues? -- Dyu-s-a-ty.
PROG-2-2I-TV-eat well PROG-1-TV-eat
'Are you eating? --I'm eating.' (4;35)

b. Kuñ dyu-m-e-ty pues? -- Dyu-n-a-ty ajpaw tixum.
what PROG-SB-2-eat well PROG-1SB-TV-eat two shrimp
'So what are you eating? --I'm eating two shrimp.' (4;35)

c. Dy-a-rang piats mi-koj? -- Ngok, dy-a-rang kex.
PROG-TV-maketortilla POS-older.sib no PROG-TV-makecheese
'Is your older sister making tortillas? No, she's making cheese.' (3;40)

d. *dyu-m-e-r-u-ty
PROG-SB-2-2I-TV-eat
Intended meaning: 'You (sg.) are eating.' (4;35)

e. *dyu-n-a-j.muly
PROG-1SB-TV-enter
Intended meaning: 'I am going in.' (4;34)

Suffixing verbs, which are all intransitive, behave like the prefixing intransitive verbs in building progressive forms on the atemporal. Notice the vowel coalescence in the second-person forms.

(6.72) Progressive paradigm for suffixing verbs (1;161)

dyu-wit-*io*-u-s PROG-rise-V-ITR-1	dyu-wit-*io*-u-s-*u*n PROG-rise-V-ITR-1-PL
dy-i-wit-*io*-r PROG-2-rise-V-2I	dy-i-wit-*io*-r-u-n PROG-2-rise-V-2I-ITR-PL
dyu-wit-*io*-w PROG-rise-V-ITR	dyu-wit-*io*-u-j PROG-rise-V-ITR-3PL
dyu-wit-*io*-u-r PROG-rise-V-ITR-INC	

Some examples of progressives of suffixing verbs are in (6.73). There is variation where suffixing verbs can use a prefix *dya-* instead of the also-acceptable *dyu*.

(6.73) Progressives of suffixing verbs

a. Dyu-jongoy-o-Ø a iow.
PROG-boil-V-ITR D water
'The water is boiling.' (2;150)

b. Dyu-xijnd-io-w a iow porke lejk-ia-n leng pal-a-w.
PROG-spill-V-ITR D water because open-V-ST where close-TV-ITR
'The water is spilling out because it's open where the closure is.' (3;24)

c. dya-chup-io-w
PROG-fill-V-ITR
'it's filling up' (2;13)

The progressive can also apparently be used for ongoing actions in the past.

(6.74) Past uses of the progressive

Tapojt dyu-s-a-sapaw.
last.night PROG-1-TV-yawn
'Last night I was yawning.' (2;37)

Progressive verb forms can be negated by preposing *ngo me*.

(6.75) Negation

A(l)=lomb-o-m an ngo me dy-a-ndiak.
DUR-stand-V-SB just not ME PROG-TV-speak
'S/he's just standing, not talking.' (2;151)

6.3.6 Durative

The durative aspect is used with verbs that indicate ongoing states more than they do actions. Verb roots that commonly take the durative include *-me* 'to sleep'; *-pak* 'to be alive'; *-j.laik* 'to exist; be present'; verbs indicating position like *rrond-*, *te-*, and *longy-* (all of which mean 'hang') and *xety-* 'lean'; and body posture verbs like *chut-* 'sit', *pajk-* 'lie face up', *mojk-* 'lie face down', *ntsojly-* 'lie on one's side', etc.

The durative is formed with a particle *al*, which carries person marking, plus the subordinate (which carries person and number). This *al* is certainly related to the locational one in §5.4.3, which also takes person marking, but the durative version of it is different in that it does not mark number. The *l* is sometimes dropped due to the initial consonant of the immediately following subordinate form.

(6.76) Durative paradigm for prefixing verbs (1;102)

s-al=n-a-me 1-DUR=1SB-TV-sleep	s-al=n-a-me*y*-*a*n 1-DUR=1SB-TV-sleep-PL
i-l=m-e-me 2-DUR=SB-2-sleep	i-l=m-e-me*y*-*a*n 2-DUR=SB-2-sleep-PL
al=m-a-me DUR=SB-TV-sleep	al=m-a-me*y*-*a*f DUR=SB-TV-sleep-3PL
al=m-a-mey-ar* DUR=SB-TV-sleep-INC	

(6.77) Durative paradigm for suffixing verbs (*chut-* 'sit, dim.' & *tsot-* 'sit, aug.')

s-al=chut-u-n (2;91) 1-DUR=sit-V-1SB	s-al=chut-u-n-u-n* 1-DUR=sit-V-1SB-ITR-PL
i-l=chut-u-m-ia-r (2;91) 2-DUR=sit-V-SB-2-2I	i-l=chut-u-m-e-r-u-n* 2-DUR=sit-V-SB-2-2I-ITR-PL
al=chut-u-m (2;92) DUR=sit-V-SB	al=tsot-o-m-o-j (2;92) DUR=sit-V-SB-ITR-3PL
al=chut-u-m-u-r* DUR=sit-V-SB-ITR-2I	

(6.78) Durative usage examples

a. Al=m-a-pak-af mi-mam mi-tyety?
DUR=SB-TV-live-3PL POS-mother POS-father
'Are your mother and father living?'

b. I-(l)=m-e-j.laik ntsoy? -- S-a(l)=n-a-j.laik.
2-DUR=SB-2-be aunt 1-DUR=1SB-TV-be
'Are you here, aunt?' --'I'm here.' (3;28)

c. S-al=pia-n wax mats.
1-DUR=lie-1SB on cot
'I'm lying on the cot.' (3;21)

d. Aj ka baston ka al=xet-ia-m wax ka-tañ a iom.
D D cane D DUR=lean-V-SB on POS2-belly D house
'The cane is leaning against the (wall of the) house.'(3;29)

Like other verb forms, nouns, and adjectives, the durative can be negated by preposing the particle sequence *ngo me*.

(6.79) Negation

Ngo me s-al=n-a-me.
not ME 1-DUR=1SB-TV-sleep
'I am not sleeping.' (1;102)

6.3.7 Stative

Statives are formed with the mobile affix *n*. The inflectional paradigm is shown in (6.80). Note that although the meaning of the root *ndyu* in the stative is 'sick', in other tenses and aspects it means 'die; get cold.' (To express 'get sick', a periphrastic expression is used.)

(6.80) Stative paradigm (2;55)

n-a-ndyu-*a*s ST-TV-sick-1	n-a-ndyu-*a*s-*a*n ST-TV-sick-1-PL
ñ-e-ndyu ST-2-sick	ñ-e-ndyu-*a*n ST-2-sick-PL
n-a-ndyu ST-TV-sick	n-a-ndyu-*a*f ST-TV-sick-3PL
n-a-ndyu-ar ST-TV-sick	

Statives are found with both theme vowels in prefixing verbs, *a-* and *u-*, as well as with suffixing verbs. The pattern of person marking (and presumably number marking as well, though I do not have the relevant data) is similar in *u*-themes as in *a*-themes, as in the examples in (6.81). The main difference is in the second-person form in (6.81b), where (parallel to other *u*-themes) an additional morpheme *r* (2nd person intransitive) is inserted before the theme vowel, preventing it from coalescing with the second-person *e-* as it does in the *a*-theme paradigm.

(6.81) Inflection on u-theme statives (2;107)

a. ñ-u-kwal-as 'I am pregnant'
ST-TV-bear.child-1

b. ñ-e-r-u-kwal 'You (sg.) are pregnant'
ST-2-2I-TV-bear.child

c. ñ-u-kwal 'She is pregnant'
ST-TV-bear.child

Statives have a single argument only. Those with the theme vowel *a-* are generally formed from intransitive verbs, mainly inchoatives, and indicate the state that obtains after the change of state denoted by the verb root has happened. Many of these translate as adjectives; see §5.2. Note the example in (6.82c), which is built on the passivized version of a transitive verb.

(6.82) Usage examples: *a*-theme statives

a. Aj ka n-a-wajk pajk ke pol-io-t.
D D ST-TV-dry branch D break-V-CP
'The dry branch broke.' (3;23)

b. N-a-xip.xip xi-mbe.
ST-TV-swell.RED 1POS1-mouth
'My mouth is swollen.' (2;97)

c. n-a-nchil-ach
ST-TV-grind-PASS
'ground up' (2;144)

On the other hand, statives with the theme vowel *u-* are formed from transitive verbs. For its single argument, a *u*-theme stative takes the direct object of the base verb, which has undergone the process or action indicated by the verb. Both predicating and attributive uses are represented in the following examples.

(6.83) Usage examples: *u*-theme statives

a.

Aj	ka-w	a	joy	ñ-u-oly	najñe.
D	D-PL	D	hammock	ST-TV-tie	well

'These hammocks are tied well.' (1;100)

b.

I-kiu	mion	ñ-u-tikim	pay	ke.
2-take	from	ST-TV-fold	handkerchief	D

'Bring that folded handkerchief.' (2;144)

Statives are also formed on suffixing verb roots, like in the examples in (6.84). The precise semantic differences between a-theme statives and suffixing statives is not certain, since both are strategies for making statives from intransitive verbs. I note however that the suffixing statives do not seem to indicate change of state in the inherent properties of the argument the same way that a-theme statives do.

(6.84) Usage examples: suffixing statives

a.

Lejk-ia-n	u-mbe	a	iom.
open-V-ST	POS1-mouth	D	house

'The door of the house is open.' (2;145)

b.

Tong-o-n	tiot	a	iow.
pour-V-ST	down	D	water

'The water is poured out on the ground.' (2;177)

Stative-like inflectional patterns are also used on nonproductively derived adjectives starting with *ñi-*, which can be morphologically analyzed as the stative affix with a fossilized theme vowel *i-* (cf. §5.3.1).

(6.85) Inflectional paradigm of i-theme statives (2;60, 3;29)

ñ-i-anch-ius ST-TV-lazy-1	ñ-i-anch-*iu*s-*a*n ST-TV-lazy-1-PL
ñ-e-r-i-anch ST-2-2I-TV-lazy	ñ-e-r-i-anch-*io*n ST-2-2I-TV-lazy-PL
ñ-i-anch ST-TV-lazy	ñ-i-anch-*iu*f ST-TV-lazy-3PL
ñ-i-anch-ior ST-TV-lazy-INC	

Statives are negated either by preposing *ngo me* to the stative form, or by preposing *ngo* to the subordinate form. It is not clear whether the latter strategy necessarily has the semantics of negating the inchoative (atemporal), since it is used in some contexts where the inchoative may not be intended.

(6.86) Negation of statives

a. ngo me n-a-kants
not MI ST-TV-redden
'It's not red.' (2;133)

b. ngo m-a-kants
not SB-TV-redden
'It's not red.' (2;133)

6.3.8 Irregular and defective verbs

There is one irregular verb root, -*w* 'to go out', which builds its second-person singular forms on a root *diow* /diw/. The basic paradigms are shown below.

(6.87) Irregular paradigms of -*w* 'to exit' (1;170)

a. Atemporal

s-a-w 1-TV-exit	s-a-u-n 1-TV-exit-PL
i-diow (*yow /i-w/) 2-exit	i-u-n 2-exit-PL
a-w TV-exit	a-u-j TV-exit-3PL
a-u-r TV-exit-INC	

b. Subordinate

n-a-w 1SB-TV-exit	n-a-u-n 1SB-TV-exit-PL
m-e-diow (*miaw /m-e-w/) SB-2-exit	m-e-u-n SB-2-exit-PL
m-a-w SB-TV-exit	m-a-u-j SB-TV-exit-3PL
m-a-u-r SB-TV-exit-INC	

c. Completive

t-a-u-s CP-TV-exit-1	t-a-u-s-*u*n CP-TV-exit-1-PL
t-e-diow (*tiaw /t-e-w/) CP-2-exit	t-e-u-n CP-2-exit-PL
t-a-w CP-TV-exit	t-a-u-j CP-TV-exit-3PL
t-a-u-r CP-TV-exit-INC	

One hypothesis for the origin of the irregular forms is that second-person singular forms were once regular, with a second-person prefix *i/e* plus the root, but, perhaps for reasons having to do with the word being very short, it came to be further prefixed with another, redundant second-person prefix *i/e*, along with the second-person intransitive *r*. At some point, morpheme boundaries were reinterpreted such that the CVC sequence following the initial second-person became fossilized as an irregular suppletive root; the fact that there were two markers of second-person probably made it easier for one of them to be reinterpreted as something other than second-person. Incidentally, this stage is attested in the San Mateo del Mar dialect in the irregular forms *i-riiow* 'you (sg.) exit' and *i-riiow-an* 'you (pl.) exit' (Stairs & Hollenbach 1981:325). Lastly, the flap *r* changed to a voiced coronal stop *d*, a very similar segment differing mainly in duration.

(6.88) Possible development of irregular 2nd person root -*diow* 'exit'

*io-w > *i-r-iow > *i-riow > i-diow

In the San Francisco del Mar dialect, there are two other irregularities related to verbs for 'come' and 'go', specifically, imperative forms that neither are built on a root that exists otherwise in the language, nor have the expected inflectional patterns.

(6.89) Irregular forms of 'go' and 'come'

a. Mak! 'Come (here)!', 2sg. (1;156)
b. Mak-an! 'Come (here)!', 2pl. (1;156)
c. Tabar! 'Let's go!' (2;63)

(6.89b) has the plural suffix, but neither (6.89a) nor (6.89b) has overt second-person marking. The lack of second-person marking does have parallels in other commonly used imperative forms in the language (see §6.1.3), however.

In the case of (6.89c), a first-person inclusive, one can recognize the first-person inclusive suffix -*r*. If one were to hypothesize that this form is built on a root -*b* that is diachronically related to -*mb* 'go', it would look like a first-person inclusive in the completive aspect, with the completive prefix *t*-. The origins of this form are unclear, however. It may be noted that the San Mateo del Mar dialect also has *tab-ar* 'Let's go!', referring to the speaker and hearer only, plus another form *tab-aats* 'Let's go!', with the first-person inclusive plural ending, referring to the speaker and hearer plus one or more other participants. I do not have anything corresponding to the latter form in my San Francisco data, although I have not directly asked speakers whether it exists.

I note that the existence of (6.89c) does not preclude the use or grammaticality of productive first-inclusive hortatives formed with the subordinate, as seen in (6.27d).

Another irregularity in the verb system involves forms of the verb -*jior* 'have', which often appears in a form that has a vowel prefixed to a subordinate form. I interpret these as most closely related to duratives, since these verb forms seem to mean 'be in ongoing possession of'. With duratives we would expect first-person marking, which is not found (6.90ab), and consistent usage of the second-person form in (6.90c) to the exclusion of its optional variant (6.90a), which is why these cannot be considered to be canonical duratives.

(6.90) Irregular forms of *-jior* 'to have'

```
a. Kuñ    a=m-e-jior      iow?   --  Al=n-a-jior.
   what   DUR-SB-2-have   water      DUR=1SB-TV-have
   'Do you have water?  -- I do.'   (4;7)

b. Xiok   a=n-a-jior          ñi.soty.
   I      DUR=1SB-TV-have     fault
   'It's my fault.' (4;3)

c. Miaw.an  mi-laik[3]   i=m-e-jior?
   all      POS-tooth    2=SB-2-have
   'You have all your teeth?'   (2;102)

d. Aj  ka  Rrey  ke  a=m-a-jior        arujpaw  mi-kwal    nax.
   D   D   king  D   DUR=SB-TV-have    three    POS-child  girl
   'That King had three daughters.'  (4;45)
```

6.4 Valence-Changing Morphology

Huave has valence-decreasing and, to a lesser extent, valence-increasing morphology of varying degrees of productivity. In this section I will describe a non-productive marker of intransitives (§6.4.1), a productive reflexive (§6.4.2), three non-productive processes of derivational passivization along with a productive passivizing or impersonalizing suffix (§6.4.3), and non-productive strategies for transitivization of intransitive (largely anticausative) roots (§6.4.4). In conjunction with §6.4.4 I also

[3] The root *-laik* 'tooth' normally belongs to Class 1, a closed class, and takes the second-person possessive *i-*. The use of the productive Class 3 possessive *mi-* indicates that there is variation in the noun class system that may be related to language obsolescence.

discuss productive analytic causative constructions. Lastly, in §6.4.5 I point out some verb roots that appear to have unusual argument structure.

6.4.1 Intransitive aspiration

Many verb roots occur with an aspirated theme vowel. The morphological constituency has been rendered in this thesis as "j.Root." This aspiration is found only on intransitive verbs in my data so far (although it functions in the San Mateo del Mar dialect as a transitivity toggle; Stairs & Hollenbach 1981:331-333). I consider it lexically specified, since I have not found a unifying semantic or other generalization to cover the set of verbs that take it.

The aspiration is best seen as an autosegment, due to its (optionally) prosodic rather than segmental anchoring. It sometimes occurs on the penultimate syllable of the word, rather than on the theme vowel. In an unsuffixed stem with a monosyllabic root, the two environments coincide. However, addition of a suffix means that the aspiration can either stay on the theme vowel, or surface on the penult, inside the root. In (6.91b), the appearance of the aspiration on the root syllable conditions laryngeal dissimilation (§2.5.1) in the third-plural suffix /-jw/, which surfaces as the fused segment -*Vf* in (6.91a), but as -*Vw* in (6.91b). In (6.91h) the aspiration shows up on the antepenultimate syllable, which could have to do with the fact that its appearance on the penultimate syllable would violate the cooccurrence restriction on **js* sequences (§2.2.5).

Another phonological alternation is that the aspiration is seemingly not audible (i.e. it seems to be deleted) many times when the theme vowel is in an antepenultimate or earlier syllable. The frequency of deletion appears to vary according to the voicing of the root-initial segment; see §2.5.4 for more detail.

(6.91) Optional mobility of intransitive aspiration

	Pre-root aspiration		Root-internal aspiration
a.	t-a-j.tip-iuf CP-TV-rise-3PL 'they rose' (3;52)	b.	a-ti.j.p-iow TV-rise-3PL 'they rise' (3;27)
c.	s-a-j.laik 1-TV-be 'I am [sad]' (2;22)	d.	s-a-la.j.k-ion 1-TV-be-PL 'we are [here]' (1;64)
e.	t-a-j.chik-iuf CP-jump-3PL 'they jump' (3;52)	f.	t-a-chi.j.k-ior CP-TV-jump-INC 'we (incl.) jump' (3;46)
g.	t-a-j.ngot-os-on CP-TV-come-1-PL 'we (excl.) come' (4;15)	h.	t-a-ngo.j.t-os-on CP-TV-come-1-PL 'we (excl.) come' (1;69)

I know of no transitivity alternations that consist simply of the presence or absence of aspiration. However, in many transitivity alternations, an aspiration in the intransitive member is not present in the transitive member. See for example the passivization alternations in §6.4.3.3 and some of the causative alternations in §6.4.4.

6.4.2 Reflexive

The reflexive suffix -*e*, which belongs to Layer 2, can make a verb reflexive (6.92) or reciprocal (6.93), and can also be used for self-benefactive semantics (6.94). See §6.1.4 on theme vowel selection with reflexives, and §2.2.1 on variation in whether the reflexive induces palatalization on a preceding consonant.

(6.92) Reflexives

a. T-a-xot-ey-af n.a.mix mu.n.a.ngich.
CP-TV-hide-RF-3PL small youth
'The children hid themselves.' (2;1)

b. Xiok ndyu-s-a-kejch-e.
I PROG-1-TV-teach-RF
'I am studying.' (2;3)

c. I-ndil-i-m-e-r-e mion domingo mismo.
FT-turn-V-SB-2-2I-RF from Sunday same
'You'll come back (from there) on Sunday too.' (2;116)

d. I-jir-e.
2-have-RF
'Take care of yourself.' (2;104)

(6.93) Reciprocals

a. Ñi.ngion t-a-xum-e-s-an i t-a-ndiak-as-an akiuj.
over.there CP-TV-find-RF-1-PL and CP-TV-speak-1-PL with
'There, we met (each other) and talked (with each other). (1;139)

b. Dy-a-wajch-ey-af.
PROG-TV-hit-RF-3PL
'They're hitting each other.' (4;36)

c. Tiol s-al=n-a-pak, i-m-a-jaw-ey-ar.
if 1-DUR=1SB-TV-live FT-SB-TV-see-RF-INC
'If I am alive, we'll see each other.' (3;51)

d. T-a-mbul-ey-af wax[4], pa m-a-xeng-iaf anots xiol.
CP-TV-help-RF-3PL on to SB-TV-raise-3PL one wood
'They help each other to raise a pole.' (2;151)

(6.94) Self-benefactives

a. T-a-chejch-ias tiot anek n-a-wajk rama para n-a-xuñung-e biom.
CP-TV-fell-1 down one ST-TV-dry branch to 1SB-TV-pile-RF fire
'I dropped a dry branch to get a fire together.' (3;23)

b. pa m-e-rang-e a cena
for SB-2-do-RF D dinner
'so you can have yourself dinner' (2;13)

c. I-tyuch mion nday to.ka aj ka gancho par n-a-not-e a pang.
2-push from toward here D D cane for 1SB-TV-pull-RF D chair
'Throw the cane (from you) to here so I can pull the chair to me.' (2;47)

d. Naw n-a-xum lyai(w) pa n-a-lyejk-e.
not 1SB-TV-find key for 1SB-TV-open-RF
'I didn't find a key to open it.' (1;133)

[4] This appears to be a particle verb construction. Both the final syllable of the main verb and the particle itself are stressed.

In (6.95) are some examples that need to be studied further before the semantic contribution of the reflexive can be accurately characterized. It may be that "reflexive" is not the best label for this suffix. The words in (6.95ab) combine the valence-increasing causative with the valence-decreasing reflexive, and hint at complexities of internal causation. The reflexive suffix appears, optionally and seemingly relatively productively, with many descriptive verbs and adjectives (6.95c), including mimetics (see more examples in §6.5.1 on reduplicated words). There are also a number of lexicalized idiosyncratic uses of the reflexive: e.g. *pak-* + *-e* 'to look, appear' from the root *-pak* 'strong, alive' (6.95d), a stative form of the same root, *n-a-pak-e*, meaning 'to be in good health' (6.95e), and *-ndiom-e* 'be greedy' from *-ndiom* 'want' (6.95f).

(6.95) Other uses of the reflexive

a.

A-tang-ajch-e	n-a-j.ñe
TV-grow-CAUS-RF	ST-TV-good

'It grows well.' (said of a plant species) (3;18)

b. A-wind-ijch-e.
TV-twist-CAUS-RF
'S/he twists and stretches (his/her body).' (2;109)

c.

Ungius	wax	ka	a-w	mi-nalily	xi-lyej,	a-ngojch-e.
night	when	G	TV-exit	POS-sweat	1POS1-foot	TV-sticky-RF

'At night when my foot sweats, it's sticky.'[5] (4;37)

d.

Tiol	ngo	m-e-jim,	ngo	pak-a-m-e	n-a-j.ñe.
if	not	SB-2-sweep	not	live-V-SB-RF	ST-TV-good

'If you don't sweep, it doesn't look good.' (3;26)

e.

Xuwe	k-a-ndiom-e.
much	G-TV-want-RF

'S/he is very greedy.' (2;140)

f. N-a-pak-ey-as.
ST-TV-live-RF-1
'I am well, healthy.' (2;27)

[5] The oddness of this sentence is due to a misunderstanding during elicitation of *piel* (skin) as *pie* (foot).

The self-benefactive and "other" examples indicate complex semantics and pragmatics in the use of the reflexive. This is very likely a rich area for future research.

6.4.3 Passivization

Huave has several ways of passivizing verbs. Some roots are lexically specified for one of three non-productive passivization strategies; in addition, there are two productive strategies. The semantic or syntactic differences between the various morphological means of passivization are not yet known. Nevertheless, what they all have in common is that they reduce valence such that the passivized verb takes only one argument, which is the object of the verb root in its non-passivized form.

6.4.3.1 -rV- infixation

One non-productive method of passive formation is the infixation of *-rV(j)-* before the root-final consonant, such that a CVC root (the only root shape this infix is attested with) goes to CV-rV-C. (The phonological rules determining the quality of the vowel are covered in chapter 4.) No conditioning factors have been found for the unaspirated versus aspirated allomorphs, so I tentatively conclude that the allomorphy is lexically idiosyncratic. Following is a list of all *rV(j)*-passivizing roots attested in my data, and a few examples in sentence context.

(6.96) Verb roots with *-rV-* passives

a.	-tsamb	'bite'	-tsa-ra-mb	'be bitten'	(2;30)
b.	-ndok	'fish'	-ndo-ro-k	'be fished'	(2;109)
c.	-xum	'find'	-xu-ru-m	'be found'	(2;97)
d.	-xeng	'raise'	-xe-re-ng	'be raised'	(2;118)
e.	-ndiak	'speak'	-ndia-ra-k	'be spoken'	(2;93)
f.	-ndiom	'want'	-ndi-ra-m	'be necessary'	(2;129)
g.	-miot	'bury'	-mi-raj-t	'be buried'	(2;119)
h.	-sap	'catch'	-sa-raj-p	'be caught'	(2;106)
i.	-jimb	'sweep'	-ji-ri-mb	'be swept'	(3;26)

(6.97) -rV- infixation

a.

Aj	ka	chiok	a-ndo.ro.k	xuwe	nday	to.ka.
D	D	mojarra	TV-is.fished	much	toward	here

‘The *mojarra* is fished a lot around here.’ (2;109)

b.

Dy-a-paj	a	so	wax	dy-u-sa.raj.p,	dy-a-sa.raj.p.
PROG-TV-call	D	pig	when	PROG-TV-caught	PROG-TV-caught

‘The pig squeals when it is being caught.’ (2;106)

c. X-i-n-a-mi.raj.t
1-FT-1SB-TV-be.buried
‘I’ll be buried.’ (2;71)

d.

T-a-j.laik	anek	órden	u-kwej	gobierno	par	ngo
CP-TV-be	one	order	POS1-thing	government	for	not

m-a-ndia.ra.k	u-mbey-ajts.
SB-TV-spoken	POS1-mouth-INC

‘There was an order by the government that Huave not be spoken.’ (2;93)

6.4.3.2 *-ch* suffixation

A second non-productive way of forming passives, apparently specific to a small group of roots, is the suffix *-Vch*. Although this is homophonous with the unaspirated allomorph of the causative suffix *-V(j)ch*, none of the roots I know of that take one of these suffixes also takes the other. The inflectional properties of these passivized roots are unknown, as is the hierarchical status of the passive suffix relative to other affixes. Because I do not have examples of this suffix cooccurring with other suffixes, its position in the affix-order hierarchy is unknown.

(6.98) Verb roots with -*Vch* passives

a.	-rang	‘do, make’	-rang-ach	‘be done, made’	(1;100)
b.	-nge	‘hear’	-ngey-ach	‘be heard, audible’	(2;119)
c.	-ngay	‘pay’	-ngay-ich	‘be paid’	(2;146)
d.	-yak	‘put’	-yak-ach	‘be put’	(2;118)
e.	-pior	‘sow’	-pir-ach	‘be sown’	(1;111)
f.	-rriujt	‘choose’	-rriujt-ach	‘be chosen’	(2;120)
g.	-yajk	‘conocer’	-yajk-ach	‘be known’	(2;145)

(6.99) -*Vch* passives

a.

Xa-joy	naw	m-a-rang-ach	n-a-j.ñe.
1POS-hammock	not	SB-TV-make-PASS	ST-TV-good

‘My hammock was not made well.’ (1;100)

b.

La	ngo	m-a-pir-ach.
PF	not	SB-TV-sow-PASS

‘It is not sown anymore.’ (1;111)

c.

Ñinga	k-a-pir-ach	a	us.
here	G-TV-sow-PASS	D	maize

‘Here, maize is sown.’ (2;109)

d.

Aj	ka	naxuy	ke	a-yajk-ach	u-mbas	ke	an	ta.
D	D	man	D	TV-feel-PASS	POS1-front	where	just	MOT

‘That man is known/recognized everywhere.’ (2;145)

6.4.3.3 Aspiration and depalatalization

A third set of active-passive alternations is found with the verbs listed in (6.100). To passivize, these verbs acquire a pre-root *j* of the sort found with many intransitive verbs. In (6.100gh), the addition of *j*- to a vowel-initial root creates a CVC syllable, whereas in all the consonant-initial roots the *j*- surfaces as aspiration on the theme vowel. In conjunction with this, they also depalatalize the root-final consonant, if the root-final consonant is palatalized (which in most cases it is). Historically, the process must have been one of final-(front)-vowel deletion, since the root-final palatalization contrast came about via the loss of final vowels. The two changes, *j*-addition and depalatalization, are seen most plainly in (6.100ab).

Another change that occurs in some roots is phonologically regular. Due to laryngeal dissimilation, the addition of *j* causes the deletion of any aspiration or *j* in the root syllable, as shown in (6.100d-g). In (6.100fg), laryngeal dissimilation (deletion of the aspirated root vowel) happens in addition to depalatalization.

The only verb in the list that does not undergo some change in the root is (6.100c), which has neither an aspirated vowel nor a root-final consonant.

(6.100) Verb roots with aspirated and final-depalatalized passives

a.	-kaly	'wait for'	-j.kal	'be waited for'	(2;95)
b.	-tsoly	'stab'	-j.tsol	'be stabbed'	
c.	-mbi	'kill'	-j.mbi	'be killed'	(2;108)
d.	-paj	'call, yell'	-j.pa	'be called'	(2;126)
e.	-kaj	'look for'	-j.ka	'be looked for	
f.	-naijp	'sell'	-j.nap	'be sold'	(2;108)
g.	-ojty	'dig'	-j.ot	'be dug'	
h.	-uñ	'buy'	-j.un	'be bought'	(2;128)
i.	mbajy-	'collapse'	-j.mba	'break, shatter' (tr., itr.)	(4;53)

The pair in (6.100i) is a special case, because the form-to-argument structure relationship is different from all the other examples: the base root with the palatalized coda *mbajy-* is intransitive, while the root with aspiration and depalatalization *-j.mba* is transitive. Furthermore, the intransitive member is more unaccusative than passive, in that there is no implied agentivity in the action as in the other verbs, as well as being suffixing (in opposition to the rest of the verbs, which are prefixing). The "transitive" member *-j.mba* is also attested with both the unaccusative and the transitive meanings. Phonologically, this root stands out from the others because it is the only one ending in a palatal glide. Depalatalization thus deletes the segment entirely.

(6.101) mbajy-/-j.mba

a. La mbajy-a-w a iot.
PF break-V-ITR D earth
'The earth has collapsed and slid down.' (4;53)

b. I-j.mba penawan a piats.
2-break half D tortilla
'Break the (hard) tortilla in two.' (3;76)

c. T-a-tsapijch-ius a xur i t-a-j.mba.
CP-TV-drop-1 D pot and CP-TV-break
'I dropped the pot and it broke.' (3;23)

6.4.3.4 Productive passivization strategies

This brings us to the two productive methods of passivization. One consists of replacing a theme vowel *a*- with the theme vowel *u*-. This strategy is only available when there is a Layer 1 affix that would license the theme vowel *u* (§6.1.4), namely with the stative, subordinate, and completive. Examples can be found above in (6.20).

The other productive passivization strategy is the addition of the impersonalizing suffix -*rVn*, which may originate from a concatenation the passive infix -*rV*- with the plural suffix -*n.* These forms, like other passives, are often translated by speakers with Spanish third-person plural verbs. Some examples are shown in (6.102); the ones in (6.102aef) are better characterized as impersonalization rather than passivization, and it is possible that the other passive-like usages will turn out to be morphosyntactically distinct from other kinds of passivization. Note that -*rVn* suffixation is available even to verbs that alternatively participate in one of the nonproductive passivization strategies (6.102ae). It also seems to be available in a range of tense/aspect categories, including those that are structurally eligible for *u*-theme passivization. In fact, the form in (6.102g) has both a *u*-theme and the -*rVn* suffix. With consonant-final roots, a vowel is epenthesized prior to the suffix according to the principles of vowel harmony as described in Chapter 4.

(6.102) -rVn passivization

a. leng k-a-ndok-oron
where G-TV-fish-PASS
'the place where people fish' (2;100)

b. ot ki k-a-mut-urun xa-naty
as this G-TV-write-PASS 1POS-name
'My name is written like this.' (2;110)

c. Ñi.ngion chu a-tsoj-oron a mu-nax.
over.there QUOT TV-play-PASS D PL-girl
'It was said that there, girls were abused.'
(reason why girls did not go to school) (4;24)

d. T-a-kojch-iran miaw.an a frut.
CP-TV-cut-PASS all D fruit
'All the fruit was cut.' (2;144)

e. Dy-a-jimb-iran.
PROG-TV-sweep-PASS
'People are sweeping/It is being swept.' (2;128)

f. N-a-ju-run[6] jang mi-max, n-a-ju-run jang u-kwej.
ST-TV-see-PASS who POS-canoe ST-TV-see-PASS who POS1-thing
'It was visible whose canoe it was, it was visible whose it was.' (3;69)

g. Ty-u-saip-iran.
CP-TV-gift-PASS
'It was given as a gift.' (2;128)

It is not clear to what extent person marking is found on *-rVn* passives. What is clear is that an analytic construction is preferred, with a third-person plural form of the verb and a personal pronoun as direct object. (The third-person plural might in fact be considered another passivization strategy, since it is used even where there is no agent implied.) Although this topic needs to be investigated further, one speaker agreed that the forms in (6.103ac) were grammatical, supplying the glosses quoted for the forms suggested by me. However, when asked to repeat them, he gave the analytic versions in (6.103bd). This speaker is known to veto ungrammatical forms, so there may be something to the marginal grammaticality.

(6.103) Person marking on productively formed passives (4;29)

a. ?dy-a-mbul-urun-uj
PROG-TV-help-PASS-3PL

[6] It is not clear why the root *-jaw* has been reduced to *-ju*, but this is consistent in all tokens of this form throughout the field data.

b. dyu-m-a-mbul-uj aj ka ñipinaj ke
PROG-SB-TV-help-3PL D D people D
'They (those people) are being helped.'

c. ?dy-i-mbul-urun-un
PROG-2-help-PASS-PL

d. dyu-m-a-mbul-uj inan
PROG-SB-TV-help-3PL you.PL
'You (pl.) are being helped.'

In contrast, the same speaker had, immediately beforehand, provided person-marked paradigms for *rVn*-suffixed passives of *already* nonproductively passivized roots of the aspirated and depalatalized type in (6.100). A third-person singular is in a), and the rest of the forms are plural. The -*rVn* suffix appears redundant, as the passivized roots can already take person and number inflection directly, unless it can be shown that the suffix is contributing impersonal semantics on top of the passivization inherent to the aspirated and depalatalized root.

(6.104) Person-marking on multiply-exponed(?) passives (4;28)

a. dy-a-j.kal-aran
PROG-TV-waited.for-PASS
'He's being waited for.'

b. dyu-s-a-j.pa-ran-an
PROG-1-TV-waited.for-PASS-PL
'We (excl.) are being called.'

c. dy-i-j.pa-ran-an pa m-e-mb-an to.kion.
PROG-2-waited.for-PASS-PL for SB-2-go-PL over.there
'You (pl.) are being called to go over there.'

d. dy-a-j.pa-ran-af
PROG-TV-called-PASS-3PL
'They are being called.'

e. dy-a-j.pa-ran-ar
PROG-TV-called-PASS-INC
'We (incl.) are being called.'

6.4.4 Causativization/Transitivization

The causative suffix takes a plain-vowel form *-Vch* with some verb roots and an aspirated-vowel form *-Vjch* with others. The presence of aspiration appears to be lexically idiosyncratic. The causative is the innermost suffix to the root, and it is not productive. The following lists thus contain most if not all of the noncausative/causative alternations I have attested in my data so far. In (6.105) is a list of prefixing verbs that take the causative suffix, and in (6.106) is a list of suffixing verbs that take it (becoming prefixing in the process).

The suffix I refer to as the "causative" may also be seen as a transitivizer, since all the roots that take it are intransitive. It is the innermost suffix; no other morpheme ever intervenes between it and the root.

(6.105) Prefixing/Prefixing-Causative

a.	-mbol, -mbol-o(j)ch	'fear; frighten'	(4;12)
b.	-lyeng, -lyeng-ejch	'straighten'	(3;103)
c.	-kats, -kats-ajch	'get wet; wet'	(3;61)
d.	-mbiol, -mbel-ach	'roll'	(3;17)
e.	-tang, -tang-ajch	'grow/raise (plants, people)'	(3;67, 3;73)
f.	-xip, -xip-ich	'fatten'	(3;33, 2;152)
g.	-jiong, -jing-ach	'(make) dance'	(2;119)
h.	-j.muly, -mul-ich	'enter; put in' (*meter*)	(3;57)
i.	-j.miok, -mik-ach	'descend; lower'	(3;24)
j.	-j.poty, -pot-ich	'burst'	(2;119, 3;63)
k.	-j.laly, -lal-ijch	'(make) fly'	(3;88)
l.	-j.tsor, -tsor-ijch	'go home; return sthg.'	(2;122)
m.	-jay, -jay-ich	'walk; drive'	(3;44)

(6.106) Suffixing/Prefixing-Causative

a.	chut-/-chut-uch	'sit; make sit'	(4;30)
b.	chup-/-chup-ijch	'fill (with liquid)'	(1;169, 3;28)
c.	mond-/-mond-och	'fill (with solids)'	(3;28, 4;52)
d.	pots-/-pots-ojch	'begin'	(3;21, 3;28)
e.	pal-/-pal-ach	'end'	(3;22, 1;129)
f.	wit-/-wit-ich	'rise; raise'	(1;161, 2;69)
g.	jiry-/-jir-ich	'scatter, (make) go to pieces'	(3;65)

h. lonch-/-lonch-ich	'loosen'	(3;60)
i. wejk-/-wek-ech	'(cause to) be born'	(1;163, 3;17, 3;89)
j. tsajpy-/-tsajp-ijch	'slip out/let go'	(3;23, 3;24)
k. kanch-/-kanch-ich	'gather'	(3;21, 2;21)
l. wind-/-wind-ijch-e	'estirar(se)'	(2;109)
m. pandy-/-pand-ijch	'(make) rot'	(4;13)
n. pax-/-pax-ich	'be satisfied; satisfy'	
o. ndro-/ndro-jch	'be lost, ruined/lose, ruin'	

The root *lyeng* 'straighten, set right' is a special case because its prefixing version (6.107a) apparently has the same meaning as its suffixing causative (6.107b), and these two forms are opposed to the prefixing causative (6.107c). This is the only example I have of a suffixing causative; since suffixing verbs are intransitive, and causatives are transitive, this combination of characteristics in a single form is highly unexpected and probably has to do with the ambiguous semantics and agentivity involved in a bent object that becomes straight (or straightens itself).

(6.107) Suffixing-Causative/Prefixing-Causative (3;103)

a. t-a-lyeng 'It straightened'
CP-TV-straighten

b. lyeng-e-jch-iat 'It straightened (itself)'
straighten-V-CAUS-CP

c. t-a-lyeng-ejch 'S/he straightened it'
CP-TV-straighten-CAUS

There are a few residual cases of apparent causatives that do not fall into neat categories, perhaps for historical reasons. One type consists of pairs that seem to be related through a causativization alternation, but whose relationship is somewhat less semantically transparent, like the pair in (6.108a). Another type consists of disyllabic, transitive verb roots with *-V(j)ch* rimes in their second syllable, but no corresponding verb root that lacks the apparent causative (6.108bcd). Lastly, the example in (6.108e) has the causative suffix appended to the word for 'here', to give the meaning 'hurry up'.

It is the only example I have so far of the causative suffix with a base that is not a verb root. It is lexicalized, as it can be used in the meaning 'hurry up' even when the desired directionality of the hurrying is away from the speaker (2;77).

(6.108) Residual cases

a.	-mby/-mb-ich	'be finished, used up'/'use sthg. for a certain purpose'
b.	-kumujch	'break into small pieces'
c.	-xumbech	'bathe (someone else)'
d.	-tsapijch	'let go, release hold of sthg.'
e.	-ñinga-jch	'hurry up'

Apart from overt causative morphology, there is another morphological alternation where some verb roots come in a suffixing version that is stative or inchoative, as well as a prefixing, causative version. This group includes verbs of breaking and bending, verbs describing positions, and others. However, membership in this category of morphological alternations does not appear to be predictable on a purely semantic basis, since there is some overlap with the examples above. For example, it is not clear why 'sit' (6.106a) would behave differently from other body-posture verbs.

(6.109) Suffixing/Prefixing

a.	mbax-/-mbax	'untwist, unbraid'	(3;59, 2;71)
b.	sojndy-/-sojndy	'pull out'	(3;60)
c.	poly-/-poly	'break' (e.g. stick)	(3;23, 3;59)
d.	parry-/-parr	'break, split cleanly'	(3;56)
e.	chiot-/-chiot	'break, rip'	(3;59)
f.	ndojky-/-ndoijk	'cut'	(2,18;3,56)
g.	konch-/-konch	'bend' (e.g. wire, twisting one's ankle)	(3;65)
h.	xijndy-/-xijndy	'pour out'	(3;24, 3;105)
i.	pojch-/-pojch	'stretch out (cloth)'	(3;66, 3;93)
j.	xujku-/-xujkuñ	'turn off, extinguish'	(4;29)
k.	rra-/-rra	'give off light, be clear'	(3;25)
l.	jongoy-/-jongoy	'boil'	
m.	sonong-/-sonong	'pile up'	(2;109, 3;23)
n.	mbajk-/-mbajk	'separate'	(3;80)

Positions

o.	longy-/-loing	'hang'	(2;109)
p.	rrond-/-rrond	'hang'	(3;24)
q.	tye-/-tye	'hang, spread out'	(2;110)
r.	lyench-/-lyench	'be/put in line'	(3;57)
s.	pajk-/-pajk	'lie face up'	(2;92, 3;24)
t.	mojk-/-mojk	'lie face down'	(2;92, 3;24)
u.	xety-/-xety	'lean against sthg.'	(3;24, 3;29)
v.	pej-/-pejp	'lie down, lay down'	(1;165, 3;16)
w.	lyejk-/-lyejk	'open'	(1;24)
x.	pal-/-pal	'close'	(3;22)

There are a couple of suffixing inchoatives whose transitivization strategy (if any) I do not yet know: *jeng*- 'se pande' (3;103) and *rrajmb*- 'melt' (3;23).

In (6.110) is a short list of cross-linguistic "usual suspects" for morphological causativization alternations, but which do not participate in any such alternation in Huave. Instead, the roots for the semantically related pairs are completely different. They are cited in the third-person singular, with a theme vowel preceding the root.

(6.110) Root suppletion

a.	a-ndyu 'dies'	b.	a-mbi 'kills'
c.	a-jaw 'sees'	d.	a-tijp 'shows'
e.	a-ndajp 'burns (itr.)'	f.	a-mbuly 'burns (tr.)'
g.	a-j.lich/a-j.ndach 'falls'	h.	a-chejch 'drops'

The only fully productive way of expressing causativization is through a syntactic construction. The most common construction involves a form of the root *-jch* 'give' plus the appropriate subordinate form of the verb being causativized. A few examples are shown in (6.111). Another analytic causative construction, in (6.112), involves *-rang* 'do, make' plus the verb being causativized.

(6.111) Analytic causatives with *-jch* 'give'

a. Aj ka ñuñch ke xu <u>ka a-jch</u> xiok <u>ñ-u-kwik</u>.
D D boy D much G TV-give me ST-TV-laugh
'That boy really makes me laugh.' (3;16)

b. Wax la ndo-Ø k-a-t-iuf i-m-a-jants a pulat i
when PF finish-ITR G-TV-eat-3PL FT-SB-TV-wash D plate and

m-a-x m-a-waj akiub anek jely.
SB-TV-give SB-TV-get.dry with one cloth
‘When they’ve eaten she’ll wash the plates and dry them with a cloth.’ (3;23)

c. Xa-kwal ngo m-u-nge. Xu ka a-jch xiok n-a-j.kay.
1POS-child not SB-TV-hear much G TV-give me 1SB-TV-get.angry
‘My child doesn’t listen. He really makes me angry.’ (3;25)

(6.112) Analytic causatives with *-rang*

a. Xiok xu s-a-paij m-a-rang a najngoy.
I much 1-TV-belch SB-TV-make D food
‘The food makes me belch a lot.’ (4;28)

b. A-jionts ka-up a xiol m-a-rang a ion.
TV-cry POS-leaf D tree SB-TV-make D wind
‘The wind makes the tree leaves make noise.’ (2;66)

In sum, the system of valence alternations in Huave is rather complex.

6.4.5 Verbs with unusual argument structure

There are a few verbs with unusual argument structure. One is the impersonal -*joty* ‘to rain’, which is perhaps trivial. The more interesting verbs are the ones where the morphological subject is the semantic object, despite the lack of any overt passive morphology. The two that I know of are illustrated below; complete paradigms remain to be collected. I have stuck to a literal translation of the third-person plural Spanish forms with which these words were glossed, but such forms do not necessarily imply an overt agent.

(6.113) *-joy* ‘to be hit’ (2;68)

a. dyu-s-a-joy
PROG-1-TV-be.hit
‘They are hitting me.’

b. dy-i-joy
PROG-2-be.hit
'They are hitting you (sg.).'

c. dy-i-joy-ion
PROG-2-be.hit-PL
'They are hitting you (pl.).'

d. dy-a-joy-ior
PROG-TV-be.hit-INC
'They are hitting us (incl.).'

(6.114) -*sek* 'to be said (either to someone, or in general)'

a. Ot ki s-a-sek.
as this 1-TV-is.said
'So they tell/told me.' (2;35)

b. Ot ki t-a-sek-ius-an.
as this CP-TV-is.said-1-PL
'So they told us (excl.).' (2;35)

c. "Nita Dono" k-a-sek a ñu.
Nita Dono G-TV-is.said D she
'She is called Nita Dono.' (2;135)

6.5 Morphophonological Derivation

6.5.1 Reduplication

Huave has three kinds of reduplication: full reduplication, partial suffixing reduplication, and partial prefixing reduplication. Full reduplication is productive and typically has repetitive/pluractional meaning. It is also found in many mimetics, which refer to smells, sounds, etc., and many of which only exist in fully reduplicated form.

The semantics of full reduplication include the overlapping categories of repeated action, voluminous or intense action, mimetics, and descriptive characteristics.

(6.115) Full reduplication: examples

a. Dyu-m-e-konts.konts i-ñuj, ñ-u-tsam.
PROG-SB-2-rub.RED 2POS1-eye SB-TV-bite
'You're rubbing your eyes, they itch.' (2;71)

b. ndy-a-j.lich.lich xi-miajts
PROG-TV-fall.RED 1POS1-heart
'My heart is beating.' (2;37)

c. a-lang.lang a xiol
TV-sway.RED D tree
'The trees sway (in the wind)' (2;65)

d. Iok ñ-i-ngañ, por es dy-i-ndiak.ndiak
you ST-2-drunk so PROG-2-speak.RED
'You're drunk, that's why you're chattering away' (2;?)

e. Dyu-n-a-nge ndy-a-kwas.kwas u-lyej anop ñipinaj
PROG-1SB-TV-hear PROG-TV-tread.RED POS1-foot one person
'I hear the sound of a person's footsteps.' (2;68)

f. Dy-a-rrox.rrox
PROG-TV-spark.RED
'It's making sparks.' (3;25)

g. Ñ-u-ndoy.ndoy tiot.
ST-TV-cold.RED down
'It's cold weather.' (3;15)

h. L-a-tang.tang mu-nax
PF-TV-grow.RED PL-girl
'grown-up girls' (2;137)

Partial reduplication is not productive, and I have found no conditions that predict whether a partially reduplicated root undergoes prefixing or suffixing reduplication. In the majority of cases partial reduplication is suffixing, copying the final VC; prefixing reduplication copies the initial CV. Many of these forms also have repetitive, pluractional, or mimetic meaning.

(6.116) Suffixing reduplication

a.	-mbep.ep	‘tremble’	(3;38)
b.	-puk-uk	‘embrace’	(2;44)
c.	-ndil.il	‘turn over; go back and forth; repeat’	(3;24)
d.	-sop.op	‘drizzle’	(2;26)
e.	ñ-u-ndot.ot	‘strong wind’	(3;24)
f.	-rrap.ap	‘pour, disperse (tr.)’	(2;119)
g.	-rrop.op	‘pour, disperse (itr.)’	(2;119)
h.	ñ-u-rix.ix	‘clean’ (adj.)	(3;18)

(6.117) Prefixing reduplication

a.	-sa-sap	‘grab, catch’	(2;72, 3;18)
b.	-tyuj.tyujk-e	‘cluck’ (chicken)	(2;77)
c.	ntso.ntsok	‘wrinkled’	(2;33)
d.	n-a-ða.ðam	‘very big’	(3;18)

There are very few phonological alternations associated with any of these types of reduplication. Some partially reduplicated forms appear to denasalize prenasalized affricates, as in (6.118), which is a variant of (6.117c) as given by a different speaker. The roots in (6.118ab) may also be analyzable terms of de-prenasalization, though the alternative analysis is that it is simply a disyllabic root and the similarity of the consonants is coincidental. The root in (6.118d) can confidently be analyzed as reduplication due to the independent attestation of a root *monts-* ‘close (hand, eye)’. I do note that none of the partially reduplicated words in my database so far reduplicate a prenasalized affricate, though due to the small number of examples this could be an accidental gap.

(6.118) Affricate devoicing in reduplication

a.	tso.ntsok	‘wrinkled’	(2;33)
b.	-rrants.ats	‘itch’	(1;98, 2;119)
c.	-rinch.ich	‘itch, dim.’	(2;119)
d.	-monts.ots	‘close (hand, eye)’	(2;26)

Consonant clusters are tolerated at the boundary between reduplicants, unlike in most word-internal contexts elsewhere in the language, but there is still degemination when the root-initial and root-final consonants are identical (which in general applies productively across word boundaries, so this is unsurprising).

(6.119) Degemination in reduplication

a. I-taj.tajt a jely
2-shake.RED D clothes
'Shake the clothes.' (2;65)

b. ñ-u-pu.pup
'breeze' (3;24)

A couple of reduplicated mimetics are found both with and without the reflexive suffix. Whereas in (6.120a) the reflexive serves an intransitivizing function, the difference in meaning in (6.120b) is unclear.

(6.120) Reduplication and reflexives

a.	-joy.joy,	-jo(y).jo-e	'sway'	(2;75, 3;24)
b.	-mbepep,	-mbep.ep-e	'tremble'	(2;13)

Reduplication is also a device used in the syntax, for emphasis (6.121ab) or repetitive semantics (6.121c), and possibly other functions as well that will be uncovered in future research.

(6.121) Syntactic reduplication

a. m-a-kaly ñ-u-rix.ix ñ-u-rix.ix
SB-TV-stay ST-TV-clean ST-TV-clean
'(that) it is left very clean' (3;18)

b. i-lyej i-lyej an
2POS1-foot 2POS1-foot just
'barefoot' (referring to 2nd person sg.) (2;72)

c. nakam nakam
across across
'back and forth' (3;60)

6.5.2 Diminutivization

Verbs can be diminutivized to talk about attenuated versions of states and actions, and/or the participation of people in them about whom one wants to speak affectionately. The semantics of diminutivization vary in different verbs, and like diminutives in many languages, they can but do not necessarily refer to literal size or intensity. Although Suarez (1975) claimed that diminutives are/were formed very productively, I have had very limited success in eliciting them. Attempts to elicit sentences about babies or children, or follow-up questions to diminutives asking how one might talk about a different, related situation *con cariño* ("with affection") often yielded non-diminutives, meaning at a minimum that if there are diminutive forms for those verbs, they are used only optionally.

By contrast, there is a number of core diminutives that are controlled by all speakers and used frequently. In the case of body-posture verbs in particular, context-inappropriate use can be highly infelicitous, and speakers readily and consistently give diminutive forms when asked to talk about young children or to speak *con cariño*. Beyond those, my database contains a modest number of augmentative/diminutive pairs that have arisen in texts and spontaneous speech, were volunteered by speakers and discussed with them during elicitation sessions, or that I was able to elicit. The productivity of diminutivization and constraints on productivity remain to be investigated, and some potential directions for research are outlined in this section.

Diminutivization essentially involves raising of all non-high root vowels to high, plus palatalization of any eligible (i.e. coronal) root-final consonants.[7] Verb roots with

[7] To the extent that the plain/palatal contrast arose historically from the loss of final vowels, respectively, palatalization would have been the allophonic result of final vowels being raised to high.

/e/ form diminutives by raising /e/ to /i/. Note that associated with vowel raising is the reduction of trills to flaps in (6.122de), as well as in further examples below, due to the general phonotactic ban on trills adjacent to high vowels (§2.2.5).

(6.122) Diminutives of /CeC/ roots

a.	-(j)-mbek.mbek	-mbik.mbik	'flop around'	(1;100, 2;62)
b.	pej-	pij-	'lie down'	(1;165)
c.	-pejp	-pijp	'lay (sthg.) down'	(3;16, 3;102)
d.	-rrejk	-rijk	'touch'	(2;26, 2;127)
e.	-rrejp	-rijp	'touch'	(2;148)

Verb roots with /o/ raise it to /u/. Due to regular, allophonic consonant palatalization before front and high vowels, the shift from /o/ to /u/ induces palatalization on eligible plain consonants (i.e. non-rhotic coronals) preceding the root vowel(s).

(6.123) Diminutives of /CoC/ roots

a.	tsot-	chut(y)-[8]	'sit'	(2;116)
b.	lomb-	lyumb-	'stand; stop'	(2;112)
c.	ntsojly-	nchujly-	'lie on side'	(3;72)
d.	mojk-	mujk-	'lie face down'	(3;72)
e.	tsoj-	chuj-	'play'	
f.	-ntsoy	-nchuy	'wrinkle'	(3;86)
g.	-lojty	-lyujty	'pierce'	(3;61)
h.	-kojñ	-kujñ	'fold'	(2;2, 3;105)
i.	-loy	-lyuy	'pliable'	(2;21, 3;65)
j.	-loing	-lyuingy	'hang'	(4;24)
k.	-tong	-tyung	'pour'	(2;21)
l.	-sonong	-xuñung	'pile up'	
m.	-sop.op	-xup.up	'rain lightly/very lightly'	(2;26)
n.	-toj.tok-e	-tyuj.tyuk-e	'cluck' (chicken)	(2;77)
o.	-ngolos-e	-ngulus-e	'make a creaking sound'	(2;106)
p.	-porros	-purux	'make a crunching sound'	(2;149)

Verb roots with /a/ diminutivize either by raising to /i/, as in the examples in (6.124), or to /u/, as in the examples in (6.125). All diminutive-forming roots with /a/

[8] Palatalization of this particular root-final consonant seems to be optional; it is not known why.

that I know of use only one of these two strategies. It is not yet clear whether the choice is morpholexically idiosyncratic, has a historical-phonological reason, or has any kind of synchronic conditioning.

(6.124) Diminutives with *i* of /CaC/ roots

a.	-lang	-ling	'wave back and forth'	
b.	-rra	-ri	'illuminate; make clear'	(2;120, 128)
c.	-ndan	-ndiñ	'get stuck, blocked up'	(2;151)
d.	-wantsak	-winchik	'twist'	(3;65)
e.	tarrap-	tirip-	'wide'	(2;117)
f.	-rrap.ap	-rip.ip	'pour, disperse'	(2;119)
g.	pa.pajly-	pi.pijly-	'be rolled, drawn up'	(2;116)
h.	-rrants.ats	-rinch.ich	'itch'	(1;98, 2;119)

(6.125) Diminutives with *u* of /CaC/ roots

a.	-jañ	-juñ	'quick, light'	
b.	na-paty	na-puty	'hard'	
c.	-yaj.yaij	-yuj.yuij	'shake gently'	(2;145)

As for the other two vowels in the Huave system, the high vowels /i/ and /u/, there is no indication that roots with these vowels form diminutives. Noyer (2003) notes that roots with high front vowels form a gap with respect to diminutivization in the San Mateo del Mar dialect (where the process involves both raising and fronting).

With body posture verbs, speakers consistently explain the difference between augmentative and diminutive forms by saying that the latter is "*con cariño*" ("with affection"). 'Sit' has especially exaggerated pragmatics to the extent that the diminutive form is unmarked. Augmentatives imply anger (scolding a child to sit down) or are used of animals or are otherwise used pejoratively. (Suppletive verb pairs with similar pragmatics include *-ty* 'eat'/*-la* 'fressen', and *-ngañu* 'drink'/*-jorror* 'quaff'.)

One avenue for speculation is that the productivity of diminutivization depends partly on phonological characteristics of the roots, even among those which categorically speaking are eligible, that is, contain non-high vowels. I base this speculation on three observations. First is the high proportion of /o/-based diminutives in my small sample, along with the wide semantic range of the /o/-root verbs that form diminutives. If semantics were the only factor, we might expect more verbs to have diminutive counterparts. Second, *pajk-* ‘to lie face up’ lacks a diminutive, as confirmed by a speaker (3;72), whereas all other body-posture verbs have them; this could be due to the vowel *a*. Third, there are very few diminutives formed on verb roots where the environment for diphthongizing the root vowel obtains.

Chapter 7

Mobile affixes and affix order

7.1 Affix mobility

As seen in the paradigms in Chapter 6 and in examples throughout the dissertation, Huave has “mobile affixes,” which appear as prefixes in some contexts, and as suffixes in others. Mobile affixes exist alongside regular prefixes and suffixes in the language. Some examples are shown in (7.1): the first-person *s* is a prefix in (7.1a) (where it is palatalized to *x* by regular phonology), but a suffix in (7.1b) and (7.1d); the first-person subordinate *n* is prefixal in (7.1a) but suffixal in (7.1c); and the completive *t* is prefixal in (7.1b) but suffixal in (7.1d).

(7.1) Affix mobility

a.	**x**-i-**n**-a-jch 1-FT-1SB-TV-give ‘I will give’ (1;174)	c.	pajk-a-**n** face.up-V-1SB ‘(that) I lie face up’ (2;92)
b.	**t**-a-jch-iu**s** CP-TV-give-1 ‘I gave‘ (1;174)	d.	pajk-a-**t**-u-**s** face.up-V-CP-ITR-1 ‘I laid face up’ (2;92)

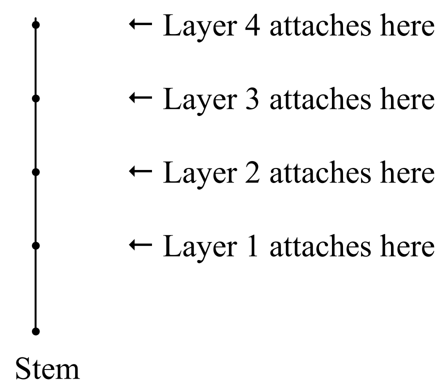
The phenomenon of affix mobility raises two interlocking questions. First, what determines whether a mobile affix surfaces as a prefix or a suffix? Second, how can mobile affixes be integrated into a coherent general analysis of affix order in Huave? In this chapter, I establish that there are two interacting sets of principles behind Huave affix order. One is morphological: despite the phenomenon of affix mobility, it can be shown that affixes (mobile and non-mobile alike) occur at a fixed distance from the root relative to other affixes. In derivational terms, one might say that they attach in a fixed order. The other set of ordering principles applies specifically to mobile affixes, and is phonological: whether a mobile affix surfaces as a prefix or suffix depends on phonological properties of the base to which it attaches. Noyer (1993) was the first to point out the fact of phonological conditioning, for a few mobile affixes in the Huave variety of San Mateo del Mar. The present chapter builds on this observation by analyzing the entire set of mobile affixes in the related variety of San Francisco del Mar, and giving a full picture of the hierarchical and linear structure of all the affixes, mobile and non-mobile alike.

The Huave data bear on an important architectural issue of the morphology-phonology interface: In what ways, and by what mechanisms, can phonology influence surface morphological structure – e.g. the position of an affix within a word? Here I propose a "layer model" for the structure of the Huave verb. It captures a crucial separation of *affix hierarchy*, i.e. abstract constituent structure, from *affix placement*, the factors - in this case phonological - locating a mobile affix on one or the other side of the stem (Stump 1992, Noyer 1997). Morphemes are arranged in hierarchical layers expanding symmetrically outward from the stem, as illustrated in (7.2); an alternative visualization is the tree in (7.3), with underspecified direction of node branching. More generally, I will advance the hypothesis that affix hierarchy in all languages is determined in the morphology/morphosyntax, and that phonological conditions on affix order are universally limited to the domain of affix placement.

The structure of the chapter is as follows. Section 7.2 lays out the structure of the Huave verb, demonstrating the morphological, hierarchical ordering of affixes. Section 7.3 shows that affix mobility is phonologically conditioned, and develops the formal analysis. Lastly, 7.4 contextualizes the proposal within recent work on the morphology-phonology interface and discusses some theoretical consequences.

(7.2) [L4 [L3 [L2 [L1 [Stem] L0] L1] L2] L3] L4]

(7.3)



7.2 Hierarchical structure in the Huave verb

In this section, I illustrate the unusual phenomenon of mobile affixes, and show that each Huave verbal affix can be assigned to a "layer" according to its relative distance from the root. I motivate several layers, corresponding to the derivational order in which affixes attach. Every affix can be identified as belonging to a particular layer, and the order of attachment is consistent for mobile affixes just as it is for prefixes and suffixes. For example, a Layer 1 affix will always attach prior to a Layer 3 affix, regardless of which side of the root it surfaces on. Through this layer model, it is possible to make sense of the morphological structure of the Huave verb, despite the fact that affixes appear to "hop around" among different linear positions. In other words, I demonstrate the independence of the hierarchical constituent structure of the affixes from the factors that locate a mobile affix on the left versus right side of the root.

The "layers" in Huave verb structure are, roughly, alternating zones of mobile and non-mobile affixes. Mobile affixes are found in Layers 1 and 3. Layer 2 consists of prefixes/suffixes occurring between Layers 1 and 3, and Layer 4 consists of prefixes/suffixes outside Layer 3.

(7.4)	[L4	[L3	[L2	[L1	[Stem]	L0]	L1]	L2]	L3]	L4]
	Prefix	Mobile	Prefix	Mobile		Suffix	Mobile	Suffix	Mobile	Suffix

For example, the Layer 1 mobile affix *-n-* (1st person subordinate), is always inside the Layer 2 Future (7.5a) or the Reflexive (7.5b). The Layer 3 affix *-s-* (1st person) is always outside of both the Future (7.5ab) and the Reflexive (7.5c). To discuss hierarchical relations more clearly I will sometimes talk about the relative time of attachment, e.g. Layer 1 attaching "before" Layer 2, but a derivational theoretical view of word formation is not crucial to the argument.

(7.5)	[L4	[L3	[L2	[L1	[Stem]	L0]	L1]	L2]	L3]	L4]
a.		**x**	i	**n**	a-xot			e		
			1	FT	**1SB**	TV-hide			RF	
	'I will hide myself'			(2;6)						
b.		**x**	i		ndil-i		**ñ**	e		
			1	FT		turn		**1SB**	RF	
	'I will turn around'			(2;1)						
c.				t	a- xot			ey	a**s**	
				CP	TV-hide			RF	**1**	
	'I hid myself' (2;6)									

The affixes in each layer are listed in (7.6). Prefixes are shown in the top row, suffixes in the middle row, and mobile affixes in the bottom row. Layer 4 suffixes are separated into Layers 4a and 4b to reflect the ordering of the passive *-rVn* before the various plural suffixes. (The layers are a descriptive device for separating mobile-affix zones from other zones of the verb, but have no independent status as theoretical entities; thus the separation into 4a and 4b rather than into Layers 4 and 5 is somewhat arbitrary.) Layer 1 is the other layer in which multiple affixes can cooccur on the same side of the stem. The generalizations behind the ordering of cooccurring Layer 1 affixes will be addressed throughout the paper.

(7.6) Affixes and layers

	L0[1]	L1	L2	L3	L4(a/b)	
Prefixes	--	*i-/e-* 2	*i-* FT	--	*ndyu-* PROG	
Suffixes	*-(j)ch* CAUS	[+rd] ITR	*-e* RF	--	*-rVn* PASS	*-n* PL *-f* 3PL *-r* INC *-(j)ts* INC
Mobile	--	*t* CP *m* SB *n* 1SB *n* ST *r* 2I	--	*s* 1	--	

The table contains all known verbal affixes except those for which there is no evidence for ordering relative to other affixes. The gerundive prefix *k-* and the passive suffix *-ch* are not known to cooccur with other affixes on the same side of the root. The infix *-rV-* surfaces internally to the root, and the intransitive *-j* appears to be positioned prosodically rather than linearly (§2.5.1). Aside from these exceptions, the table is comprehensive. In the future evidence may be found for the hierarchical position of these affixes, but no such evidence has been identified so far.

I will now give a layer-by-layer overview of the verbal affixes, starting with the stem and working outwards.

---

[1] The numbering of the first layer as "0" has less to do with any special status of the causative/transitivizing affix, than with the relatively late stage of research at which its ordering properties were discovered.

Stems divide into two types: “prefixing” (mostly transitive/unergative verbs), which consist of prefixal theme vowel plus root, and “suffixing” (mostly unaccusative-type verbs), which consist of a root plus suffix vowel. Prefixing and suffixing verbs are discussed in more detail in §6.1.1. In prefixing stems the choice of theme vowel *a* or *u* has to do with a combination of lexical semantics and arbitrary morphological conditions (§6.1.4). On the other hand, the presence of the suffix vowel in suffixing stems seems to be due to an arbitrary requirement that suffixing stems be vowel-final. The quality of the suffix vowel is determined by vowel harmony, and roots that are already vowel-final do not take a suffix vowel. Roots are lexically specified for what stem type(s) they can form. Some examples of stems (not all of which are valid freestanding words) are given in (7.7).

(7.7) Prefixing and suffixing stems

	Prefixing stems		Suffixing stems
a.	a-jaw ‘see, know (it)’ TV-see	d.	mojk-o ‘lie face down’ face.down-V
b.	u-ndiak ‘speak’, itr. TV-speak	e.	tye- ‘hang’, itr. hang
c.	a-chiot ‘break (it)’ TV-break	f.	chiot-a ‘break’, itr. break-V

Layer 0 contains the causative suffix *-(j)ch*, which is not productive, but creates transitives from a closed class of intransitive verbs. The presence or absence of the *j* in the suffix is lexically idiosyncratic. The examples in (7.8) illustrate the occurrence of causative *-(j)ch* closer to the root than any of the affixes in Layers 1 through 4.

It is extremely rare for the causative to cooccur with a Layer 1 suffix, since the causative is inherently valence-increasing and Layer 1 suffixes only occur with intransitive verbs; the availability of (7.8a) is an exception due to the ambiguous semantics of an object spontaneously becoming straight or straightening itself. Cooccurrence of *-(j)ch* with any combination of higher-layer (L2, L3, L4) suffixes should in principle be possible, although since causative (L0)-reflexive (L2) cooccurrence is rare, not all combinations have been collected yet. No alternative ordering of causative *-(j)ch* with respect to other affixes is attested.

(7.8) Layer 0: Causative

	[L4	[L3	[L2	[L1	[Stem]	L0]	L1]	L2]	L3]	L4]
a.					lyeng-e	-jch	-iat			
					straighten-V	CAUS	CP			
	‘It straightened’			(3;103)						
b.					a-wind	-ijch		-e		
					TV-twist	CAUS		RF		
	‘S/he twists and stretches (his/her body)’					(2;109)				
c.				t	a-chup	-ijch			-is	-an
				CP	TV-fill	CAUS			1	PL
	‘We (excl.) filled (it)’			(1;170)						

Of particular interest is the fact that the ordering Causative-Reflexive appears to be fixed, although a scopal analysis cannot be completely ruled out due to the small number of words where the (non-productive) causative cooccurs with the (productive) reflexive. This difference in productivity might also be related to the distance from the root. For the San Mateo dialect, Stairs and Hollenbach (1981:332) state that Causative always precedes Reflexive, and both scopal readings are possible.

(7.9) Causative-Reflexive ordering in the San Mateo dialect

a-jɨik-ich-ay
TV-appear-CAUS-RF
‘it causes (sthg.) to appear’ OR ‘it shows itself’

In contrast to the single-affix Layer 0, Layer 1 can contain up to three affixes. The Layer 1 affixes are listed in (7.10) in their order of attachment. The affixes in (7.10c) are mutually exclusive, never cooccurring with each other.

(7.10) Layer 1 affixes

a. Mobile: 2nd Person Intransitive *-r-* (never occurs without 2nd Person *i-/e-*)
b. Prefix: 2nd Person *i-/e-*
c. Mobile: Completive *-t-*, Stative *-n-*, or Subordinate *-n-* (1st person)/*-m-* (all other persons)

The examples in (7.11) illustrate this order of attachment by showing that the 2nd person intransitive *r* always occurs next to the stem, which is indicated by brackets, while the second-person *e-/i-* is outside (farther from the stem) than *r*, but always inside the (7.10c) mobile affixes.

(7.11) Layer 1 ordering examples

a.	i-r-[u-ty] 2-2I-TV-eat 'you eat', itr.	c.	ñ-e-r-[u-kwal] ST-2-2ITR-TV-child 'you are pregnant'
b.	t-e-r-[u-ty] CP-2-2I-TV-eat 'you ate'	d.	m-e-r-[u-ty] SB-2-2I-TV-eat '(that) you eat', itr.

The basic phonological generalization about all mobile affixes - to be expanded on throughout this chapter - is that they attach as prefixes to vowel-initial bases, but as suffixes to consonant-initial bases. (The exception is bases that are both vowel-initial and vowel-final, which introduce complications that will be discussed and resolved in §7.3.) In all the examples in (7.12), brackets enclose bases to which mobile affixes attach. Note that although Layer 1 mobile affixes always attach as prefixes to prefixing stems (7.12a-f), this is because prefixing stems are inherently vowel-initial. Similarly, suffixing stems are inherently vowel-final, so the innermost Layer 1 mobile affix is always suffixal (7.12g-l). However, the crucial examples in (7.12kl) show that the outermost Layer 1 affix is prefixal due to the vowel-initial status of the prefixed base. Mobile affix placement is thus independent of the prefixing vs. suffixing status of the stem.

(7.12) Mobile affix placement

	Prefixing stems		Suffixing stems
a,	n-[a-kants] ST-TV-red 'red'	g.	[pal-a]-n close-V-ST 'closed'
b.	t-[u-ty] CP-TV-eat 's/he ate' (itr.)	h.	[mojk-o]-t face.down-V-CP 's/he lay face down'
c.	m-[u-ty] SB-TV-eat '(that) s/he eats' (itr.)	i.	[mojk-o]-m face.down-V-SB '(that) s/he lies face down' (3;86)
d.	i-r-[u-ty] 2-2I-TV-eat 'you eat' (itr.)	j.	i-[mojk-o-r] 2-face.down-V-2I 'you (sg.) lie face down'
e.	t-[e-r-u-ty] CP-2-2I-TV-eat 'you ate' (itr.)	k.	t-[e-mojk-o-r] CPL-2-face.down-2I 'you (sg.) lay face down'
f.	m-[e-r-u-ty] SB-2-2I-TV-eat '(that) you eat' (itr.)	l.	m-[e-mojk-o-r] SB-2-face.down-V-2I '(that) you (sg.) lie face down'

Layer 2 contains one prefix and one suffix, as listed in (7.13).

(7.13) Layer 2 affixes

a. Prefix: Future *i*-
b. Suffix: Reflexive -e

The examples in (7.14) show the Future and Reflexive occurring outside of Layer 1 affixes. Brackets enclose the Stem + Layer 1 constituent.

(7.14) Layer 2 ordering outside Layer 1

	Future		Reflexive
a.	i-[m-a-rang] FT-SB-TV-do ‘s/he will do (it)’	d.	[ndil-i-m]-e turn-V-SB-RF ‘(that) s/he turns around’
b.	i-[m-e-r-u-ty] FT-SB-2-2I-TV-eat ‘you (sg.) will eat’	e.	[ndil-i-t]-e turn-V-CP-RF ‘s/he turned around’
c.	i-[m-e-wit-io-r] FT-SB-2-rise-V-2I ‘you (sg.) will get up’	f.	[t-e-ndil-i-r]-e CP-2-turn-V-2I-RF ‘you (sg.) turned around’

Layer 3 consists of the mobile 1st Person affix *s* (which palatalizes to *x* before front vowels). The examples in (7.15) show that it occurs outside all Layer 1 and 2 affixes, regardless of the internal configurationof the Stem + Layers 1 and 2-affixed base.

(7.15) Layer 3 outside Layers 1 and 2

	[L4	[L3	[L2	[L1	[Stem]	L0]	L1]	L2]	L3]	L4]
a.		**s-**			a-jch					
		1			TV-give					
	‘I give (it)’									
b.		**x-**	i-	n-	a-jch					
		1	FT	1SB	TV-give					
	‘I will give (it)’									
c.		**x-**	i-		chut-u		-n			
		1	FUT		sit		1SB			
	‘I will sit’									
d.				t-	a-jch				-iu**s**	
				CP	TV-give				**1**	
	‘I gave (it)’									
e.				t-	a- xot			-ey	-a**s**	
				CP	TV-hide			RF	**1**	
	‘I hid myself’									

	[L4	[L3	[L2	[L1	[Stem]	L0]	L1]	L2]	L3]	L4]
f.				t-	a-chup	-ijch			-iu**s**	
				CP	TV-fill	CAUS			**1**	
	‘I filled (it)’									
g.					chut-u		-t-u		-**s**	
					sit		CP-ITR		**1**	
	‘I sat down’									
h.				ñ-	u-kwal				-a**s**	
				ST	TV-child				**1**	
	‘I am pregnant’									
i.					ndil-i		w	-ey	-a**s**	
					turn		ITR	RF	**1**	
	‘I turn around’									

Like the other mobile affixes, the first-person attaches as a prefix to V-initial bases (7.15a-c), but as a suffix to consonant-initial bases (7.15d-h). Non-factors include whether L1 mobile affixes are prefixal or suffixal (compare (7.15b), (7.15c)), and the morphological identity of the base-initial segment.

Note that the Layer 1 Stative affix never cooccurs with Layer 2 affixes on the same side of the verb. The evidence for its membership in Layer 1 is that it causes the 1st person to be a suffix, as in (7.15h), so it must be inside Layer 3. Were it not already present at the time of attachment of Layer 3, the first-person would be predicted to be prefixal rather than suffixal.

Note also the intransitive [+round] suffix, which surfaces in (7.15g) as [u] and (7.15i) as [w]. Its behavior introduces some complications, but it is analyzable as belonging to Layer 1. It is exclusively suffixal and is the outermost Layer 1 affix where it occurs, as is apparent from (7.15g). Crucially, it always occurs inside Layer 2 (7.15i).

When no other Layer 1 suffix is present, it can attach to the root, triggering vowel epenthesis and surfacing as a consonant segment, the glide [w] (7.16a). But when another Layer 1 suffix is present and that suffix is word-final, [+round] fails to surface (7.16b) even though it always occurs otherwise with with athematic verbs. Nevertheless, Layer 1 affixes do not categorically block it, since when another consonantal suffix is added (e.g. L3 first-person or L4 plural), [+round] manifests itself as the intervening vowel (7.16c). Significantly, it cannot occur outside Layer 2; in (7.16d) where a Layer 1 suffix blocks it, even the addition of L3 does not permit it to surface, and the intervening vowel is merely epenthetic (compare to (7.15i)). The upshot is that even this complicated verbal affix has strict ordering properties that appear to obey the general proposed structure.

(7.16) Intransitive [+round] (Layer 1)

a.

la=	pajk-a	-w
PF	face.up-V	ITR

'(s)he has lain down on his/her back'

b.

m- e- pia	-r
SB 2 lie.down	2ITR

'Go to bed./(that) you (sg.) go to bed'

c.

pajk-a	-m	-u	-r
face.up-V	SB	ITR	INC

'that we (incl.) lie down on our backs'

d.

ndil-i -t	-ey	-as
turn-V CP	RF	1

'I turned around'

Lastly, Layer 4 contains the progressive prefix *ndyu-* and several non-cooccurring plural-marking suffixes: the third-person plural *-f*/*-w*/*-h*/-Ø (allomorphy due to productive phonological rules), the interchangeable first-person inclusive suffixes *-r* and -*ts* (which previously indexed a dual/plural distinction that is no longer maintained), and the default plural -*n*. These are shown in (7.17) to occur outside of Layer 3. Additionally, there is a passivizing/impersonalizing suffix -*rVn* which occurs inside the plural suffixes. Attempts to elicit it together with a suffixal occurrence of the mobile Layer 3 first-person *s* have not yet been successful, since periphrastic constructions are preferred over person-marking on impersonalized forms, so I tentatively assign -*rVn* to Layer 4 until its ordering properties can be investigated further.

(7.17) Layer 4 ordering

	[L4	[L3	[L2	[L1	[Stem] L0]	L1]	L2]	L3]	L4]
a.	ndyu-	s-			a-j.lich				
	PROG	1			TV-fall				
	'I am falling'								
b.				t-	a-ndiak			-as	-an
				CP	TV-speak			1	PL
	'We (excl.) spoke'								
c.				t-	a-xum			-us	-uØ
				CP	TV-find			1	3PL
	'I found them'								
d.			i-	m-	a-jaw		-ey		-ar
			FUT	SUB	TV-see		RF		INC
	'We'll see each other.'								
e.	dyu-	s-			a-j.kal				-aran-an
	PROG	1			TV-waited.for				PASS-PL
	'We (excl.) are being waited for.' (4;29)								

This concludes the overview of basic Huave verb structure. In sum, we have now seen that Huave verbal affixes attach in a fixed order, despite the fact that mobile affixes vary in their linear position with respect to other morphemes. The prefixal and suffixal variants of these mobile affixes not only have the same phonological and morphosyntactic content, but also occupy the same hierarchical slot in the verb. For this reason I consider mobile affixes to be single affixes whose placement varies according to context, rather than as suppletive allomorphs. In my view, an analysis treating them as suppletive allomorphs (see e.g. Noyer 1997, Paster 2006) misses their fundamental unity. Variable affix placement is also known from languages and families such as Swahili (Stump 1992:138), Fula (Stump 1992:141), Afar (Noyer 1993), Hamer (Zoll 1998:134), and Athabaskan (Hargus and Tuttle 1997:207, Rice 2000:13), to name a few, so it is reasonable to consider affix mobility as a real morphological phenomenon.

It is worth noting that there does not appear to be a syntactic or semantic basis to the morphologically specified hierarchical ordering, contra the predictions of the Mirror Principle (Baker 1985) or the Relevance theory of Bybee (1985). For example, person inflection is spread out among various layers, with second person in Layer 1 but 1st person in Layer 3. Tense/aspect marking is similar: Completive is in Layer 1, while Future is in Layer 2. Additionally, there are instances of inflection inside derivation, e.g. second-person inflection in Layer 1 but Reflexive derivation in Layer 2.

7.3 Phonological optimization in mobile affix placement

In this section I present a formal analysis of the placement of mobile affixes, which as seen in section 2 is conditioned by the phonological shape of the base to which a mobile affix attaches. I argue that mobile affix placement is best modeled in terms of constraint interaction, where phonological constraints outrank morphological ones. This type of P >> M analysis, first proposed by McCarthy and Prince (1993) and used since then to model a variety of phonology-morphology interactions, has been argued against by Paster (2006) and Yu (2007). They propose instead that the source of phonologically conditioned morphology lies in morpheme-specific subcategorization frames, which can include phonological information. In the area of affix ordering, the availability of the P >> M mechanism predicts that we should find cases where the order of affixes is rearranged for the sake of phonological optimization; Paster (2005:195, 2006:227ff.) cites the apparent absence of such cases as evidence for the larger hypothesis that P >> M is never responsible for phonologically conditioned morphology of any kind.

Here, I present evidence in favor of a P >> M analysis for mobile affix placement in Huave, and also show how it is possible to admit such effects into the theory in a restrictive way that avoids the problems pointed out by Paster and Yu. For Huave, an analysis based on subcategorization misses generalizations by stipulating two separate frames for each mobile affix. The constraint-interaction analysis is preferable since it derives both the prefixal and suffixal realizations from a unified set of principles, i.e. a single constraint ranking. In light of the analysis, I discuss a problem of variation in affix placement and propose that the variation at stake is in morphological constituency, while affix placement for each variant continues to operate under the same principles. I finish the section by comparing my analysis of mobile affix placement with that of Noyer (1993), which employs P constraints that are different from the ones used here.

To better support the claim that mobile affix placement is conditioned phonologically, it is first necessary to examine and dispense with alternative hypotheses about the conditioning environment. As mentioned, mobile affixes prefix to vowel-initial bases, and suffix, often with epenthetic vowels, to consonant-initial bases. The respective contexts for prefixation and suffixation have no apparent morphologically unifying principle. The examples in (7.18) and (7.19) show that vowel-initial and consonant-initial status are not mere proxies for morphosemantic categories. In (7.18) it can be seen that the base-initial segment can be many different things morphologically, and all that seems to matter is whether it is a vowel or a consonant. (Bases that are both vowel-initial and vowel-final are slightly more complicated and will be discussed presently.)

(7.18) Mobile affix placement: blind to morphology I

	<u>Prefixed mobile affix</u>		<u>Base-initial vowel is...</u>
a.	**s**-[a-jch] 1-TV-give	'I give'	...theme vowel
b.	**x**-[i-n-a-jch] 1-FT-1SB-TV-give	'I will give'	...future marker
	<u>Suffixed mobile affix</u>		<u>Base-initial consonant is...</u>
c.	[t-a-rang]-a**s** CP-TV-do-1	'I did (it)'	...completive marker
d.	[pajk-a-u]-**s** face.up-V-ITR-1	'I lie face up'	...part of the root
e.	[ñ-u-kwal]-a**s** ST-TV-child-1	'I am pregnant'	...stative

The examples in (7.19) further show that prefixation or suffixation of mobile affixes is not tied to any particular morphological contrast, whether it be the thematic/athematic distinction or a specific tense/aspect such as atemporal, future, or completive. All of these categories are represented among both the forms with prefixed mobile affixes, and those with suffixed mobile affixes. An affix can even be mobile within a single paradigm depending on the presence or absence of other, e.g. second-person-marking, affixes; compare (7.19c) and (7.19f).

(7.19) Mobile affix placement: blind to morphology II

	<u>Prefixed mobile affix</u>		<u>Paradigm</u>
a.	**x**-[i-chut-u-n] **1**-FT-sit-V-1SB	‘I will sit’	Athematic, future
b.	**s**-[a-rang] **1**-TV-do	‘I do (it)’	Thematic, atemporal
c.	**t**-[e-chut-u-r] **CP**-2-sit-V-2I	‘you sat’	Athematic, completive
d.	i-**m**-[e-pajk-a-r] FT-SB-2-face.up-V-2I	‘you’ll lie face up’	Athematic, future
	<u>Suffixed mobile affix</u>		<u>Paradigm</u>
e.	[t-a-rang]-a**s** CP-TV-do-**1**	‘I did (it)’	Thematic, completive
f.	[pajk-a-u]-**s** face.up-V-ITR-**1**	‘I lie face up’	Athematic, atemporal
g.	[chut-u]-**t** sit-**CPL**	‘s/he sat’	Athematic, completive
h.	i-[[pajk-a]-**m**] FT-face.up-V-SB	‘s/he will lie face up’	Athematic, future

It is notable that the same principles guide the placement of all mobile affixes. This is neither immediately apparent, nor expected a priori. Although it is not clear why this is, it means that only one analysis is required to cover all mobile affixes. The constraint-based analysis developed here can be stated informally as follows: Mobile affixes (which are all consonantal) can be prefixes or suffixes. In cases where prefixation would not require epenthesis but suffixation would, prefixation is preferred; epenthesis is presumably costly. But in cases like (7.19e) where either prefixation or suffixation would require epenthesis, default placement can be diagnosed, and it is suffixal. From this we infer that mobile affixes prefer to be suffixes, but will prefix where necessary to avoid epenthesis.

I now move on to formalize the analysis within Optimality Theory. First, the fact that we get vowel epenthesis to avoid consonant clusters necessitates the following two constraints:

(7.20) a. *COMPLEX: No consonant clusters.

b. DEP: Output segments must have corresponding segments in the input. "Don't epenthesize."

These two constraints largely sufficient to determine the winner in forms where a mobile affix attaches to a vowel-initial base, as illustrated in (7.21).

(7.21)

[arang] + m	*COMPLEX	DEP
a. [arang]-m	*!	
b. [arang]-am		*!
☞ c. m-[arang]		

However, I assume that all affixes are associated with morphological Alignment constraints stating their placement properties. Formally, such constraints are desirable to prevent infixed and other unattested candidates from surfacing. We do not then need separate constraints against infixation. Additionally, by hypothesis, affix placement is salient enough that learners store generalizations, even if the generalizations might be predictable from other factors.

These constraints are essentially equivalent to subcategorization frames (as used by e.g. Bickel et al. 2007, Yu 2007), the main difference being that they can enter into constraint rankings. Since there are two placement possibilities for a mobile affix, I posit the two constraints in (7.22).

(7.22) Affix placement constraints

a. ALIGN-R: Align the left edge of the affix to the right edge of the domain. "Suffix."

b. ALIGN-L: Align the right edge of the affix to the left edge of the domain. "Prefix."

Consonant-initial, consonant-final bases like the one in (7.23) establish the ranking *COMPLEX >> DEP, since vowel epenthesis happens. (If DEP >> *COMPLEX, vowel epenthesis would not be an acceptable repair for consonant clusters.) More importantly, the ranking ALIGN-R >> ALIGN-L is needed, because when neither side of the verb offers the chance to avoid epenthesis, the affix prefers suffixal position.

(7.23) C-initial, C-final base[2]

[tarang] + s	*COMPLEX	DEP	ALIGN-R	ALIGN-L
a. [tarang]-s	*!			
b.☞ [tarang]-as		*		*
c. s-[tarang]	*!			
d. sa-[tarang]		*	*!	

Returning to the vowel-initial case from (7.21), the full tableau is shown in (7.24). Satisfaction of phonological constraints forces a violation of ALIGN-R, so the effects of lower-ranked ALIGN-L emerge. The structure of this analysis is very similar to McCarthy's (2003) analysis of Tagalog infixation, where he posits a categorical alignment constraint for each attested surface position of the relevant affix and has higher-ranked phonological constraints decide between them. However, McCarthy's

[2] In the specific case of *s* there are two possible motivations for epenthesis, cluster avoidance and satisfaction of the non-tautosyllabicity requirement of §6.1.5 that is discussed further below. However, epenthesis is the general repair for cluster avoidance, as seen throughout chapter 3.

analysis is based on a view of the infixes as underlying prefixes, and the same data are amenable to a subcategorization analysis (Yu 2007) or an analysis using gradient violations of a single ALIGN constraint, as in the previous P >> M analysis of McCarthy and Prince (1993b). The main reason for McCarthy's (2003) reanalysis is his elimination, for other reasons, of gradient constraints from the theory.

By contrast, Huave is not amenable to a gradient analysis, since mobile affix placement is either on one side of the stem or the other. Neither is a subcategorization analysis desirable, because the locus of attachment cannot be stated in a unified way, so two frames are required; but as mentioned, this misses the generalization that the surface forms can be derived from a single algorithm. The best analysis of Huave seems to be one involving the constraint schema "P >> multiple M."

(7.24) V-initial, C-final base

[arang] + m	*COMPLEX	DEP	ALIGN-R	ALIGN-L
a. [arang]-m	*!			*
b. [arang]-am		*!		*
☞ c. m-[arang]			*	

The case of consonant-initial, vowel-final bases (such as suffixing stems) is straightforward. Whereas in (7.24c) the higher-ranked morpheme-placement constraint ALIGN-R was violated to satisfy even more highly-ranked phonotactic constraints, the candidate in (7.25a) satisfies all constraints except the low-ranked ALIGN-L.

(7.25) C-initial, V-final base

[tye] + m hang + SB	*COMPLEX	DEP	ALIGN-R	ALIGN-L
a. ☞ [tye]-m				*
b. m-[tye]	*!		*	
c. ma-[tye]		*!	*	

Likewise, the analysis predicts suffixal realization of mobile affixes for bases that both begin and end with a vowel. Since neither prefixation nor suffixation would require epenthesis to avoid clusters, the preference for suffixation can be satisfied.

(7.26) V-initial, V-final base

[uy-u] + m circle-V + SB	*COMPLEX	DEP	ALIGN-R	ALIGN-L
a. ☞ [uy-u]-m				*
b. m-[uy-u]			*!	

The case of vowel-initial, vowel-final bases is complicated by the fact that cluster avoidance is not the only possible motivation for vowel epenthesis. Vowels are sometimes epenthesized for morphophonotactic reasons, specifically the requirement that Layer 3 and 4 suffixes not be tautosyllabic with the root (§6.1.5). In (7.27a), the Layer 1 subordinate affix *m* attaches directly to the vowel-final root. In contrast, the Layer 3 first-person affix *s* epenthesizes a vowel upon suffixation, as shown in (7.27b), even though epenthesis is not necessary to avoid a cluster. (The glide in the vowel-hiatus context is argued in §2.4.2 to be epenthetic rather than underlying.) Non-epenthesizing forms of the type in (7.27c) are unattested with any vowel-final root. The non-tautosyllabicity requirement can be stated as the undominated constraint in (7.27d).

(7.27) Non-tautosyllabicity requirement on Layers 3 and 4

a. Layer 1 SB attaches directly to V-final root
tia-m
hang-SB
'(that) it hangs, is spread out'

b. Layer 3 first-person epenthesizes vowel
t-a-tyey-as
CP-TV-hang-1
'I hung it up, spread it out'

c. *t-a-tia-s
CP-TV-hang-1

d. L3/4-SYLLABLE
Layers 3 and 4 suffixes and Layer 4 prefixes should occupy a distinct syllable from the root.

Due to the morphophonotactic requirement on Layer 3 and 4 suffixes, there are V-initial, V-final bases to which the Layer 3 mobile affix *s* (1st person) attaches as a prefix rather than a suffix. As shown in the tableau in (7.28), simple suffixation would violate the highly ranked L3/4-SYLL constraint. Rather than suffixation with epenthesis, the best option is prefixation, which does not require epenthesis for either cluster-avoidance or morphophonotactic reasons.

(7.28) Morphophonotactically driven prefixation on V-initial, V-final base

[i-n-a-tye] + s FT-1SB-TV-hang + 1	*COMPLEX	L3/4-SYLL	DEP	ALIGN-R	ALIGN-L
a. [i-n-a-tye]-s		*!			*
b. x-[i-n-a-tye]				*	
c. [i-n-a-tyey]-as			*!		*

In the analysis, I have assumed that the addition of each affix involves a new tableau specific to that particular affix-plus-base construction. This follows the cophonologies approach of Inkelas and Zoll (2007), and the realizational OT approach of Xu (2007). The latter differs from the current formalization in that it incorporates into the tableaus realizational constraints enforcing the realization of morphosyntactic features as certain phonological units (e.g. affixes), but it is similar in the relevant Construction-Morphological spirit.

The cyclic application of the constraint ranking with each mobile affix yields the correct outputs in steps (7.29b) and (7.29d). In (7.29c), the Future prefix is a different type of construction with different constraints. Since it only ever surfaces as a prefix, its associated constraint ranking presumably has only one Alignment constraint, ALIGN-L. This cyclic application generates the correct output, in contrast to an approach based only on phonological optimization, which might predict that a form with the two mobile affixes (SB and 1) in the reverse positions would also be grammatical.

(7.29) Cyclic outputs for derivation of x-i-chut-u-n 'I will sit':

a.	chut-u	Stem (Root + Suffix vowel)
b.	[chut-u]-n	Add mobile 1SB; suffix due to V-final base
c.	i-[chut-u-n]	Add prefix FT
d.	x-[i-chut-u-n]	Add mobile 1st person; prefix due to V-initial base

I will now discuss some problems of variability in Layer 1 affix placement, and how they might be accommodated within the current analysis. The problem is that (7.30a) and (7.30b) are apparently equally acceptable variants of the same word. When this word is elicited, an individual speaker sometimes produces one variant and sometimes the other, and when explicitly compared they are both judged to be fully grammatical. In (7.30a) the subordinate *m*, second-person *e* and second-person intransitive *r* are in the same left-to-right linear order as in (7.30b) -- but *m* and *e* are on the the opposite side of the root. (The diphthong *ia* is derived from underlying /e/ by regular phonology.) This is in opposition to the schema presented thus far, where the layers progress outward from the root in mirror-image fashion. On the basis of the intralayer hierarchy in Layer 1 (as demonstrated thus far) we might have expected the sequence *r-e-m* in suffixal position, but this is not the case. The same variation in placement of a Layer 1 affix series is illustrated in another pair of examples in (7.30cd).

(7.30) Variability in Layer 1 ordering: 2nd person subordinates of suffixing verbs

a. **m**-**e**-chut-u-**r** 'that you (sg.) sit'
SB-2-sit-V-2I

b. chut-u-**m**-**ia**-**r** 'that you (sg.) sit'
sit-V-SB-2-2I

c. **m**-**e**-ndil-i-**r**-e 'that you (sg.) turn around'
SB-2-turn-V-2I-RF

d. ndil-i-**m**-**e**-**r**-e 'that you (sg.) turn around'
turn-SB-2-2I-RF

The variability is found only in combinations of the Subordinate with the second-person affixes, and only with athematic stems. With thematic stems, the only possible forms are those with all three affixes as prefixes (7.31a). For the structurally identical combination of the Completive with the second-person affixes, only the expected affix configuration is found (7.31b), without variation. The variant in (7.31c) is comprehensible but judged as dispreferred. The marginal acceptability may have to do with cross-dialectal exposure, namely the fact that this is the form found in San Mateo to the apparent exclusion of forms like (7.31b).

(7.31) Non-variability in other Layer 1 combinations

a. **m**-**e**-**r**-u-ty 'that you (sg.) eat'
SB-**2**-2I-TV-eat

b. **t**-**e**-chut-u-**r** 'you (sg.) sat down'
CP-2-sit-V-2I

c. ? chut-u-**t**-**ia**-**r** Intended: 'you (sg.) sat down'
sit-V-CP-2-2I

Because I am assuming cyclic assessment of well-formedness, it is crucial to solve the layering paradox caused by the failure of the second-person and second-person intransitive affixes to consistently occur either closer to or farther from the root than the subordinate and completive. I propose that there is, in fact, variation between hierarchical and flat structure among the relevant Layer 1 affixes. In the (7.30ac) cases, the affixes are attached cyclically as outlined above: the basic order of attachment is followed, with the second-person intransitive *r* attaching first, followed by second-person *e*, and then by subordinate *m*, yielding the expected result.

One possibility is that the combination of the subordinate with second-person affixes has begun to be treated for placement purposes as a single morpheme. Based on the observation that the sequence *mer* behaves similarly to a single mobile affix, i.e. prefixing to vowel-initial, consonant-final stems such as in (7.31a) and suffixing to vowel-final stems in such as (7.30b), I hypothesize that the (7.30b) type forms arise from the optional treatment of the *mer* sequence as a single portmanteau (despite the fact that its segmental content is decomposable into recognizable morphemes). Its placement therefore falls under the domain of an ALIGN-R constraint, like all other mobile affixes. This analysis has the advantage that the two-affix and one-affix constructions converge on the same output for the thematic stems, due to the fact that the prefixal theme vowel obviates the need for epenthesis as long as further consonantal affixes are attached directly to it. No additional stipulations about the thematic stems are needed.

A crucial question is how and why the reanalysis of several morphemes as a single chunk could have taken place; without a plausible explanation for this, the hypothesis is empty. One place to look is in the subordinate paradigms in (7.32). In the first and third persons, the difference between thematic and athematic verbs lies in the prefixal versus suffixal placement of the subordinate affix. If the learner adopts the principle of taking everything that comes before the theme vowel in the thematic verbs, and appending it as a suffix to athematic verbs in order to form the subordinate, then (7.30b) would be the outcome.

(7.32) Partial intransitive paradigms

a. Intransitive prefixing verb, subordinate

Stem: [u-ty] 'to eat'	
a. 1 sg.	ñ-[u-ty]
b. 2 sg.	m-e-r-[u-ty]
c. 3 sg.	m-[u-ty]

b. Intransitive suffixing verb, subordinate

Stem: [chut-u] 'to sit'	
d. 1 sg.	[chut-u]-n
e. 2 sg.	[chut-u]-m-e-r
f. 3 sg.	[chut-u]-m

This rule simplification could be a result rather than the cause of the reanalysis, in which case we are still left with the question of whether the sequence *mer* could plausibly be seen as less morphologically transparent than other linear combinations of affixes. To dig deeper, two observations can be made. First, the second-person intransitive *r* never occurs independently of second-person *i/e*, so the independent status of *r* is somewhat compromised. Second, it is possible that second-person forms occur more frequently in the subordinate and completive than in the unmarked atemporal, which lacks further affixation. For example, the subordinate second-person forms (i.e. forms with *mer*) can be used as affirmative commands, as well as in all negative commands, as the second, nonfinite verb in constructions like 'Go eat!', in forming the future tense to ask or talk about what the addressee will do in the future, and perhaps in other types of situations as well. If this potentially wider range of pragmatic uses translates into actual frequency differences between second-person affixes with and without subordinate or completive markers, the status of *er* as independent from them could also be compromised. A definitive explanation will depend on further empirical research.

This “optional portmanteau" hypothesis does give us, though - in addition to empirical adequacy - a better explanation for the marginally grammatical status of (7.31c). Since it is structurally parallel to the completely grammatical form in (7.30b), an analysis more general to the grammar would have left the asymmetrical behavior of the two forms rather mysterious. However, the morpheme-specific nature of the portmanteau analysis adopted here permits us to simply say that for whatever reason, the Completive + 2nd person affixes are not as far down the path of being treated (for placement purposes) as a single morpheme.

To complete this section, it is useful to compare the present proposal with Noyer (1993), the only previous work on Huave mobile affix placement, which is based on the San Mateo del Mar dialect. The major point of similarity is that both analyses use high-ranked phonological constraints to derive prefixal versus suffixal placement. Otherwise, the two analyses are quite different, partly due to dialectal differences and gaps in the data available at the time of Noyer’s investigation.

Noyer (1993) classifies mobile affixes into three types: those whose placement is conditioned by tense/aspect (first person), those whose placement is determined by verb valence (theme vowel), and those whose placement is phonologically conditioned (subordinate, completive). Here, I claim that all mobile affix placement is phonologically conditioned.

As for the first category, suffixal realizations of the first-person marker *s* are claimed in Noyer (1993) to occur exclusively with the past tense (i.e. completive). The consequence is that mobility is conditioned exclusively by the morphological factor of tense/aspect, and so there was nothing in common with the analysis of the other mobile affixes. This is partly due to the fact that San Mateo forms the Future in a different way, obscuring what actually conditions the placement of the first person marker in that dialect. Also, stative first-person forms like (7.15h) are not attested in the primary sources on that dialect, although this may simply represent a gap in the description. However, San Mateo del Mar does have forms in the pattern of (7.19f), which contradict the tense/aspect analysis of first-person affix mobility.

As for the second category, the valence-conditioned placement of theme vowels, I do not consider theme vowels to be mobile affixes in San Francisco (see §5.1, §6.1.1). This is a minor difference in morphological analysis, and not a crucial one.

Noyer (1993) accomplishes placement of the subordinate and completive affixes exclusively with phonological constraints. Mobile affixes on this analysis have no underlying morphological preference for prefixation or suffixation, whereas in my analysis ALIGN-R is ranked above ALIGN-L in all cases. Noyer (1993) uses the following constraints:

(7.33) Constraints from Noyer (1993)

a. FINALCODA: *...V#
b. PARSE: "All segments must be prosodically licensed" (no consonant clusters)

Given the inputs [arang] + [m] and [witi] + [m], with [m] underspecified for polarity in both cases, these constraints enforce the purely phonological placement of [m] in the position that creates the most well-formed output, as illustrated in (7.34) and

(7.35). For [arang] + [m], the candidate in (7.34b) incurs a PARSE violation due to its unsyllabifiable final consonant cluster, whereas (7.34b) is phonologically well-formed and therefore wins.

(7.34)

arang + m	FINALCODA	PARSE
a. ☞ m-arang		
b. arang-m		*!

For [witi] + [m], the candidate in (7.35b) violates both PARSE (due to the initial consonant cluster) and FINALCODA, so the winner is (7.35a), which violates neither. Notice that FINALCODA is not crucial to this particular analysis; the winners are decided based on PARSE violations or lack thereof.

(7.35)

witi + m	FINALCODA	PARSE
a. ☞ witi-m		
b. m-witi	*!	*

Abstracting away from the differences in dialect data and morphological analysis, Noyer's and my analyses of phonologically conditioned affix placement are similar in spirit; this is no accident, as the latter builds on the former. The tableaus in (7.34) and (7.35) work in essentially the same way as those in (7.24) and (7.25). The present study expands on Noyer's work by bringing a wider variety of mobile affixes under the scope of the same analysis. When we consider bases that both begin and end in a consonant, as well as the morphophonological complications of bases beginning and ending in vowels, a Noyer (1993)-style analysis with P constraints only gives way to one using a P >> M ranking. Seen against the background of a general picture of affix ordering and Huave verbal structure, the behavior of mobile affixes can be understood more thoroughly.

7.4 Discussion

In this section I would like to address the implications of Huave mobile affixes for the more general issues of how phonology can influence the linear order of affixes in a word, and what kind of theory of the morphology-phonology interface is needed to account for these effects. In the model advanced here, there are two loci of phonological influences on affix order. The first is phonological subcategorization frames, of the kind used by Yu (2007) for infix placement, where affixes subcategorize for attachment to a particular phonologically-defined host. I depart from Yu (2007) in proposing that these subcategorization frames can be converted into violable, morpheme-specific OT constraints, which can then be outranked by other, purely phonological constraints. This P >> M ranking is the second locus of phonological effects on affix order, and this is the mechanism at work in Huave as well as other attested cases of phonologically conditioned variability in the placement of individual affixes.

In the recent literature, there have been two general types of approaches to phonologically conditioned morphology. In the first, which can be termed Phonological Optimization, phonology and morphology are evaluated in parallel (McCarthy and Prince 1993a). When phonological (P) constraints outrank morphological (M) ones in a P >> M ranking schema, it is more important to satisfy output constraints on phonological well-formedness than for an affix to surface in its preferred position. Affixes can consequently change position for phonological reasons. In the other approach, Phonological Subcategorization (Inkelas 1990), an affix's morphological subcategorization frame can include phonological information by specifying the affix for attachment to a certain phonological constituent (Paster 2006, Yu 2007). Variability in the position of the host constituent can give rise to apparent changes in affix position, which belie the fact that they come from a single declarative subcat frame.

The debate between P >> M and subcategorization has played out mainly with respect to infixation. Meanwhile, phonologically conditioned affix order has been analyzed both with P >> M (e.g. Hargus and Tuttle 1997 on Athabaskan metathesis) and subcategorization (e.g. Bickel et al. 2007 on Chintang free prefix order), but without direct comparison between the two approaches. In this paper I argue for that P >> M analysis of Huave mobile affix placement is superior to a subcategorization analysis - but I propose a revised P >> M model whose M constraints resemble subcategorization frames, as opposed to the general, universal types of M constraints previously used in P >> M analyses. The present model can be seen as an extension of Yu's: instead of being declarative and inviolable, subcategorization frames are violable categorical constraints which, aside from being able to contain phonological information, can further be outranked by general P constraints. There are thus two possible loci of phonological influences on morphology. Formally, the analysis is similar to McCarthy's (2003) analysis of Tagalog infixation in that Huave mobile affixes are associated with two different Alignment (M) constraints. These are ranked with respect to each other, and outranked in turn by P constraints that determine which of the M constraints is satisfied on the surface.

This proposal re-opens the door to an architecture of the morphology-phonology interface whose seemingly fatal flaws (see e.g. Paster 2006) turn out to have come from non-essential assumptions about the nature of the grammatical substance involved, rather than from the structure of the interface itself. It makes the empirically testable synchronic prediction that all cases of phonologically conditioned affix mobility will be optimizing. Importantly, it avoids the overgeneration problems that plagued previous P >> M models: following Yu (2007), I hypothesize that the inventory of possible M constraints is constrained by extragrammatical diachronic and psycholinguistic factors.

For Huave, the independent necessity of distinguishing affix layering from affix placement favors a cyclic model of word formation where affixes' order of attachment is invariant, and predetermined by the morphological component of the grammar. The principle of cyclicity inherently restricts constraint interaction (and hence P >> M effects) to the domain of affix placement, and therefore it correctly predicts the nonexistence of global, phonologically-driven affix ordering phenomena of the kind discussed by Paster (2005).The incorporation of cyclic evaluation and bracket erasure marks a departure from other Optimality-Theoretic approaches to affix order such as the Anderson (1996) and Hargus and Tuttle (1997) implementations of Generalized Alignment (McCarthy and Prince 1993a), where all morphemes are evaluated at once, and the linear order of affixes is determined by ranked, violable Alignment constraints. For example, a constraint requiring affix A to surface at the rightmost edge of the word can be ranked above a constraint requiring affix B to surface at the rightmost edge of the word, with the resulting surface affix order B--A. This approach is problematic for

Huave, because mobile affix placement is sensitive to phonological conditioning only with respect to the base it attaches to, not to the word as a whole.

Phonological conditions on affix placement are already known from the phenomenon of infixation. The comprehensive cross-linguistic study in Yu (2007) revealed that infixes subcategorize for attachment to specific phonological hosts. This contrasts with prefixes and suffixes, which subcategorize only for the left or right edge of the base. Because of the ways in which infixes arise diachronically, the hosts ('pivots') are always 'edge pivots' such as the first consonant, first vowel, last syllable or last vowel, or 'prominence pivots' such as the stressed foot or the stressed syllable (Yu 2007:67). Yu provides convincing arguments against the view of infixation as phonologically-motivated displacement, or as a 'repair' for illegal sequences created by juxtaposition of an affix with a base; in all cases, apparent variability in placement reduces to variability in the location of the pivot. This phonological pivot is stated directly in a declarative, inviolable subcategorization frame associated with the infix.

Another instance of affixes subcategorizing for a phonologically-defined host is found in Chintang (Bickel, et al. 2007). Chintang has the unusual phenomenon of free prefix order, where prefixes are free to combine in any linear order with no differences in morphological well-formedness or scopal reading. In the analysis of Bickel, et al. (2007), all prefixes subcategorize for attachment to a phonological word. Since (in addition to the base) each prefix constitutes an independent phonological word as demonstrated by independent criteria, any linear prefix order will satisfy the subcategorization requirement of all the prefixes.

Huave mobile affixes are not amenable to an analysis purely in terms of subcategorization, however. Neither are any other cases of phonologically conditioned variability in what an affix attaches to, or what side it attaches on, since affixes are normally considered to have only one subcategorization frame. Because such phenomena exist, we need a second locus of phonological effects in morphology, which is the P >> M constraint ranking schema. Alternatively, disjunctivity could be expressed by considering mobile affixes to formally be two different affixes, despite their having phonologically identical content, or by assigning two subcat frames with incompatible contexts to a single affix. But under this kind of analysis the principles (constraints) behind the affix placement would be obscured, with no formal status in the analysis. Specifically, there is no way of saying that prefixation to vowel-initial bases obviates the need for epenthesis, or that mobile affixes "prefer" suffixation. Since all known cases of such variability are phonologically optimizing, such a move would weaken the theory without any advantage in empirical coverage.

For example, many Athabaskan languages exhibit phonologically conditioned metatheses between single-segment affixes; here, I will discuss the case of Witsuwit'en as discussed by Hargus and Tuttle (1997). In Witsuwit'en, the negative prefix *s*- normally precedes tense prefixes, presumably meaning that tense prefixes attach first. However, a high-ranked constraint requires the negative prefix *s*- to surface in coda position. When the negative attaches to a base that starts with a vocalic tense prefix plus consonant-initial root, i.e. *s* + V-C, it metathesizes with the tense-prefix vowel to produce V-*s*-C, which satisfies the *s*-coda constraint. The metathesis can be handled by including phonological information in the subcategorization constraint of the negative prefix *s*- (Hargus and Tuttle 1997:207). In derivational cyclic terms, it can still always attach after the tense prefix, but a morpheme-specific alignment constraint will cause it to infix in some cases.

Hargus and Tuttle (1997:207) further show that the subcategorization constraint enforcing the alignment of the negative prefix *s*- is outranked by a phonological constraint. This is a P >> M ranking where a morpheme-specific alignment constraint containing phonological information is outranked by another, phonological constraint. Essentially, *s*- can be an onset (fail to be a coda) in order to satisfy the higher-ranked phonotactic constraint *COMPLEX ("avoid tautosyllabic VV or CC"; Hargus and Tuttle 1997:205). Metathesis is blocked just where it would create a violation of *COMPLEX. We therefore find phonologically driven variation in affix placement, but it is still consistent with fixed affix layering. Since Hargus and Tuttle use a noncyclic Generalized Alignment analysis, it is unclear how similar the analysis would be in a cyclic approach using morphologically fixed affix layering. A reanalysis of the Athabaskan data is outside the scope of the present work, but would be an important followup to test the model proposed here.

Another type of metathesis is found in Hamer, a South Omotic language, where only part of an affix metathesizes into the root. This creates discontinuity within the affix, and what Zoll (1998:133) calls 'partial infixation'. The data, from Lydall (1976:408), are given in (7.36). The <c> is, as in IPA, a voiceless palatal stop.

(7.36) Partial infixation in Hamer

a.	isin	'sorghum'	isin-**ta**	'small amount of sorghum'
b.	rac	'Rac (clan)'	ra-**t**-c-**a**	'Rac man'
c.	oto	'calf'	oto-**no**	'all calves'
d.	isin	'sorghum'	isin-**no**	'all sorghum'
e.	rac	'Rac (clan)'	ra-**n**-c-**o**	'all Rac'

Although *-ta* and *-no* are normally suffixes, suffixing them to non-coronal-final roots creates a violation of the phonotactic constraint that "only coronal consonants and nasals homorganic to a following consonant are allowed in the [presumably word-medial –YK] coda" (Zoll 1998:134). The repair is to infix the first consonant of the suffix, which is coronal, into coda position, so that the offending root-final consonant can remain an onset to the vowel of the suffix.

Zoll (1998:135) gives a P >> M analysis of *-ta* using the constraints in (7.37).

(7.37) a. P constraint: CODA-CONDITION
"Noncoronal place must release into a vowel."

b. >> M constraint: NO-INTERVENING(ta;R)
"Nothing intervenes between any part of *ta* and the right edge of the word"

In the resulting tableau, given in (7.38), the partially infixed candidate wins because it obeys highly-ranked CODA-COND while minimally violating NO-INTERVENING. Notice that partial infixation is treated as a repair, in contrast to Yu's (2007) approach. It is hard to see how a single subcategorization frame could simultaneously capture both the suffixed and partially infixed variants, but a P >> M analysis does so easily.

(7.38)

rac + ta	CODA-COND	NO-INTERVENING(*ta*)
a. rac**ta**	*!	
b. ☞ ra**t**c**a**		* (c)
c. **t**rac**a**		**!* (rac)

In short, Athabaskan and Hamer provide cross-linguistic parallels to the analysis of Huave, where P >> M rankings are used to account for phonologically driven alternations in affix placement that are not easily captured in terms of a unified subcategorization frame. I do note that of the three, Huave may be the most convincing case for a P >> M analysis, as Athabaskan and Hamer might be amenable to a more purely phonological analysis using metathesis, whereas movement between prefixal and suffixal position cannot be captured in terms of a phonological process. At any rate, the task now is to examine the wider predictions of this proposal.

One point of concern lies in the reintroduction of the P >> M constraint ranking schema as a mechanism for producing phonological effects in morphology. Paster (2005, 2006) and Yu (2007) have shown that the model undergenerates and/or overgenerates in the domains of affix ordering, phonologically conditioned suppletive allomorphy, and infixation, respectively. The basic reason why the P >> M model undergenerates is that it predicts that phonological effects in morphology will always be phonologically optimizing. Paster (2006:76ff.) and Yu (2007:31ff.) give examples of phonologically conditioned suppletive allomorphy and infixation, respectively, that cannot be interpreted as phonologically optimizing, and may even be "perverse" in that they create marked structures.

The prediction of phonological optimization is one I would like to advance for phonologically conditioned variability in affix placement, however; so far I have found no counterexamples, and the model proposed here is upheld to the extent that this prediction withholds further scrutiny. An example of something predicted not to exist is the anti-Huave system in (7.39) where consonantal affixes prefix to a C-initial/V-final base, and suffix to a V-initial/C-final base. This would be phonologically conditioned but non-optimizing variability in affix placement.

(7.39) Phonological anti-optimization (predicted not to exist)

a. m-[chut-u]
b. [a-rang]-m

As for overgeneration problems with the P >> M model, a major reason that has been given for abandoning P >> M in affix placement is the prediction that affixes will move long distances from their "home" in order to satisfy phonological constraints. Paster (2005:193) points out the prediction of global affix orderings that are stateable in terms of a single principle. In other words, we expect to find cases in which "a series of morphemes is ordered along some phonological scale" such as sonority or syllable weight. The absence of bona fide examples of this in her extensive survey of phonological effects on affix order is claimed to constitute evidence against the P >> M model. This is tied to a specific fact about classic OT, however, which is that morphology was non-cyclic; all morphemes are present in one fell swoop in the input, free to be ordered by constraints of the grammar.

Because the reintroduction of P >> M will incorrectly make the global ordering prediction in any model where all affixes are present, unordered, in the input, such as that of Anderson (1996), a cyclic model is needed. The problem therefore disappears under the cyclic view advocated in this paper, where affixes are added one by one. Once an affix is attached, it does not "migrate" elsewhere depending on how later affixes modify the phonological shape of the word; in other words, cyclicity predicts no outward visibility. We should therefore not expect to find cases of post-hoc outward movement of affixes for the sake of phonological optimization. As for apparent "inward" movement, we should only expect to find cases in which an affix alternates with an infix, since in the current model, affixes' order of attachment is fixed in the grammar and not the result of a grammatical, output-oriented algorithm. If the order of attachment is fixed, then there are only a limited number of places an affix can go: crucially, Yu's (2007) restrictive typology of pivots limits what can plausibly be analyzed as infixation.

Another overgeneration problem with previous P >> M models is the predicted but unattested phenomenon of "hyperinfixation," where infixes will continue to migrate inwards until finding a suitable spot, if the normal spot creates a phonologically unacceptable structure (Yu 2007:39ff). In the analysis presented here, affix placement variability is *not* caused by gradient violation of alignment to a single preferred location. Instead, each attested surface location corresponds to a different alignment constraint, which is categorical - either satisfied or not. Under the subcategorization conception of M constraints, hyperinfixation cannot occur because extragrammatical factors conspire against having categorical, edge-based alignment constraints that look more than one segment/syllable/foot into the word. The "cophonology" implementation ensures that each affix will be aligned with respect to the specific base to which it attaches. If, due to the restrictions on possible Alignment constraints, it is always aligned with the edge of that base, it will not be free to migrate long distances. The prediction of no-long-distance-migration is thus upheld under the proposed model. On the other hand, local metatheses (e.g. Athabaskan) are still modelable: an affix could have two M constraints associated with it, one aligning it at the word edge, and another aligning it one segment in.

In other words, on this view, issues of the P >> M model's overgeneration in the domain of affix placement (Yu 2007:37ff.) are no longer problematic. This is because constraint interaction in itself is only partially responsible for affix placement. The alignment constraints themselves can be highly idiosyncratic, language- and affix-specific, and much of the burden of cross-linguistic typological prediction therefore lies outside the synchronic analysis presented here.

In this paper I have used evidence from Huave to propose an architecture for the morphology-phonology interface, where morpheme-specific alignment constraints can contain phonological information while also being outranked by phonological markedness constraints. These P >> M rankings produce phonologically conditioned variability in the placement of an affix. I have shown that Huave affix mobility is phonologically conditioned as well as optimizing, and proposed a P >> M analysis to account for the data. This marks the reintroduction of P >> M as a viable ranking schema for phonologically conditioned affix placement (albeit with a revised conception of what M constraints are), and makes predictions that can be tested against other cases of phonologically conditioned affix mobility.

The predictions of the model remain to be tested against a wider database of examples. Elsewhere in Huave, my data contain a couple of tentative examples of phonological constraints on morphology. One is a potential instance of haplology. In §5.3.1 was a list of words formed with *ñu* + Verb Root, meaning 'person who does (Verb)'. In the one case where a verb root starts with *ñu-*, specifically the root *-ñujty* 'steal', one of these *ñu* sequences is omitted, as shown in (7.40a). It is not yet known whether the expected form is also acceptable.

Another potential instance of phonological constraints on morphology is illustrated in (7.40bc). When asked to translate from Spanish a preterite form of the verb 'chop', in the context of 'yesterday we chopped', the speaker first attempted a completive form (the form he normally gives for 'yesterday' preterites translated from Spanish), but did not produce a word. Instead, he settled the atemporal form, which is also grammatically acceptable, but (7.40b) as a whole indicates avoidance of the completive form. It is not known whether the expected completive form in (7.40c) is grammatical. One possible motivation is homophony avoidance with the root *-jch* 'give', due to the tendency to collapse and shorten sequences of identical vowels in unstressed syllables (§2.2.6). Another possible motivation is the tendency to deaspirate aspirated vowels (§2.5.4). This sometimes entails lengthening of the vowel and would give rise here to a sequence of three identical vocalic moras, which could be more problematic in antepenultimate than penultimate position (although metrical investigation of aspiration weakening has not yet been carried out).

Although more data would be needed to confirm and understand these phenomena, they may well bear on issues of the phonology/morphology interface.

(7.40) Potential phonological effects on morphology

a. ñujty (Expected: ñu-ñujty, cf. §5.3.1)
steal
'robber'

b. Xinan t-a-... t-aj... s-a-ajch-ion. Tim s-a-ajch-ion.
we.EX CP-TV CP 1-TV-chop-PL ayer 1-TV-chop-PL
'We (excl.) ... chopped (firewood). Yesterday we chopped it.' (3;88)

c. Expected but not given: t-a-ajch-is-an
CP-TV-chop-1-PL

From a cross-linguistic standpoint, the proposed P >> M model may have implications for phenomena potentially related to mobile affixation, such as phonological clitic ordering and phonological influences on the ordering of syntactic constituents (keeping in mind the fluid diachronic relationships between morphology and syntax. On the morphological side, potentially related phenomena include mobile affixes whose mobility is conditioned by morphology rather than phonology (e.g. in Fula and Swahili; see Stump 1992), variable morpheme placement in reduplication (see e.g. Hyman, Inkelas and Sibanda 1998 on Ndebele; Inkelas and Zoll 2005:116 on Tarok), and the Cibemba case where a morpheme is demonstrably attached later than, but systematically infixed into, a sequence of early-attaching affixes (Hyman 1994). The extent of similarities and differences between these and the Huave mobile affixes remains an area for future investigation.

References

Alderete, John, Jill Beckman, Laura Benua, Amalia Gnanadesikan, John McCarthy and Suzanne Urbanczyk. 1999. Reduplication with fixed segmentism. *Linguistic Inquiry* 30(3): 327-36. See also: ROA-226.

Anderson, Stephen. 1976. Nasal consonants and the internal structure of segments. *Language* 52: 326-344.

Anderson, Stephen. 1996. How to put your clitics in their place. *The Linguistic Review* 13:165-91.

Applegate, Richard. 1971. *Ineseño Chumash Dictionary and Grammar*. PhD dissertation, University of California, Berkeley.

Archangeli, Diana. 1984. *Underspecification in Yawelmani Phonology and Morphology*. PhD dissertation, MIT.

Archangeli, Diana. 1988. Aspects of underspecification theory. *Phonology* 5: 183-208.

Baker, Mark. 1985. The Mirror Principle and morphosyntactic explanation. *Linguistic Inquiry* 16: 373-415.

Bakovic, Eric. 2000. Harmony, dominance and control. PhD dissertation, Rutgers University.

Barnes, Jonathan. 2006. *Strength and Weakness at the Interface: Positional Neutralization in Phonetics and Phonology*. New York: Mouton de Gruyter.

Bates, Dawn. 1986. An analysis of Lushootseed diminutive reduplication. In V. Nikiforidou, M. VanClay, M. Niepkuj and D. Feder, eds., *BLS* 12, 1-12. Berkeley Linguistics Society.

Beckman, Jill. 1997. *Positional Faithfulness*. PhD dissertation, University of Massachusetts, Amherst.

Belmar, Francisco. 1901. *Estudio del huave*. Oaxaca.

Benua, Laura. 1997. *Transderivational Identity: Phonological Relations Between Words*. PhD dissertation, University of Massachusetts, Amherst.

Blevins, Juliette. 2004. *Evolutionary Phonology.* Cambridge University Press.

Blevins, Juliette and Andrew Garrett. 1998. The origins of consonant-vowel metathesis. *Language* 74:508-566.

Blevins, Juliette and Andrew Garrett. 2004. The evolution of metathesis. In B. Hayes, R. Kirchner and D. Steriade, eds., *Phonetically Based Phonology*, 117-156. Cambridge University Press.

Borgstrøm, C. H. 1937. The dialect of Barra in the Outer Hebrides. *NTS* 8:71-242.

Bickel, Balthasar, Goma Banjade, Martin Gaenszle, Elena Lieven, Netra Prasad Paudyal, Ichchha Purna Rai, Manoj Rai, Novel Kishore Rai, and Sabine Stoll. 2007. Free prefix ordering in Chintang. *Language* 83(1):1-31.

Brasseur de Bourbourg, C. 1861. Coup d'oeil sur la Nation et la langue des Wabi, population maritime de la côte de Tehuantepec (Méxique). *Revue Orientale et Américaine* 5, 1ère série.

Bybee, Joan. 1985. *Morphology: A study of the relation between meaning and form*. Amsterdam: John Benjamins.

Calabrese, Andrea. 1995. A constraint-based theory of phonological markedness and simplification procedures. *Linguistic Inquiry* 26: 373-463.

Campbell, Lyle. 1997. *American Indian Languages: The historical linguistics of Native America*. Oxford University Press.
Clements, G. N. 1986. Syllabification and epenthesis in the Barra dialect of Gaelic. In K. Bogers, H. van der Hulst and M. Mous, eds., *The Phonological Representation of Suprasegmentals*, 317-36. Dordrecht: Foris.
Clements, G. N. 1991. Vowel height assimilation in Bantu languages. *BLS* 17S: 25-63.
Clements, G. N. and Elizabeth Hume. 1995. The internal organization of speech sounds. In J. Goldsmith, ed., *Handbook of Phonological Theory*, 245-306. Oxford: Blackwell.
Clements, G. N. and Engin Sezer. 1982. Vowel and consonant disharmony in Turkish. In H. van der Hulst and N. Smith, eds., *The Structure of Phonological Representations, Part II*, 213-255. Dordrecht: Foris.
Cole, Jennifer and Loren Trigo. 1988. Parasitic harmony. In N. Smith and H. van der Hulst, eds., *Features, Segmental Structures and Harmony Processes*, 19-38. Dordrecht: Foris.
Cuturi, Flavia. 2000. "Tal vez estamos aquí." Autoridad, responsabilidad y "antideíctico" en las interacciones dialógicas rituales huaves. In M. Becquelin, A. Erikson, and P. Erikson, eds., *Les rituels du dialogue. Promenades ethnolinguistiques en terres amérindiennes*, 401-430. Nanterre: Société d'ethnologie.
Cuturi, Flavia and Maurizio Gnerre. 2005. Concomitance in Huave. In R. Beam de Azcona and M. Paster, eds., *Conference on Otomanguean and Oaxacan Languages (COOL)*, 51-86. Survey of California and Other Indian Languages Report 13. Berkeley, CA: UC Berkeley Department of Linguistics.
Davidson, Lisa and Rolf Noyer. 1997. Loan phonology in Huave: Nativization and the ranking of faithfulness constraints. In B. Agbayani and S. Tang, eds., *Proceedings of WCCFL 15*, 65-80. Stanford: CSLI.
Diebold, Richard. 1961. Incipient bilingualism. *Language* 37: 97-122.
Dresher, Elan, Glyne Piggott and Keren Rice. 1994. Contrast in phonology: overview. In C. Dyck, ed., *Toronto Working Papers in Linguistics* 13(1): iii-xvii.
Evanini, Keelan. 2007. The phonetic realization of pitch accent in Huave. *Proceedings of the 33rd Annual Meeting of the Berkeley Linguistics Society*. Berkeley, CA: Berkeley Linguistics Society.
Flemming, Edward. 2004. Contrast and perceptual distinctiveness. In B. Hayes, R. Kirchner and D. Steriade, *Phonetically-Based Phonology*, 232-276. Cambridge University Press.
Fowler, C. A. and M. Smith. 1986. Speech perception as "vector analysis": An approach to the problems of segmentation and invariance. In J. S. Perkell & D. H. Klatt, eds., *Invariance and Variability of Speech Processes*, 123-139. Hillsdale, NJ: Erlbaum.
Greenberg, Joseph. 1963. Some universals of grammar with particular reference to the order of meaningful elements. In J. H. Greenberg, ed., *Universals of Language*, 73-113. Cambridge, MA: MIT Press.
Gudschinsky, Sarah C., A. Harold Popovich and Frances B. Popovich. 1970. Native reaction and phonetic similarity in Maxakalí phonology. *Language* 46: 77-88.

Hall, Daniel Currie. 2007. The role and representation of contrast in phonological theory. PhD dissertation, University of Toronto.

Halle, Morris, Bert Vaux and Andrew Wolfe. 2000. On feature spreading and the representation of place of articulation. *Linguistic Inquiry* 31(3): 387-444.

Hansson, Gunnar Ólafur. 2001. Theoretical and typological issues in consonant harmony. PhD dissertation, UC Berkeley.

Hansson, Gunnar Ólafur. 2007. Blocking effects in agreement by correspondence. *Linguistic Inquiry* 38(2): 395-409.

Hargus, Sharon and Siri Tuttle. 1997. Augmentation as affixation in Athabaskan languages. *Phonology* 14(2): 177-220.

Hayes, Bruce. 1990. Diphthongisation and coindexing. *Phonology* 7(1):31-71.

Herbert, Robert K. 1986. *Language Universals, Markedness Theory, and Natural Phonetic Processes*. Berlin: Mouton de Gruyter.

Hoogshagen, Searle and Doris Bartholomew. 1993. *Gramática del mixe de Coatlán*. SIL.

Hyman, Larry. 1994. Cyclic phonology and morphology in Cibemba. In J. Cole and C. Kisseberth, eds., *Perspectives in Phonology*, 81-112. Stanford: CSLI.

Hyman, Larry. 2002. Is there a right-to-left bias in vowel harmony? Paper presented at the 9th International Phonology Meeting, Vienna.

Hyman, Larry. 2003a. 'Abstract' vowel harmony in Kalong: a system-driven account. In P. Sauzet and A. Zribi-Hertz, eds., *Typologie des langues d'Afrique et universaux de la grammaire*, 85-112. Paris: l'Harmattan.

Hyman, Larry. 2003b. Suffix ordering in Bantu: a morphocentric approach. In Geert Booij &. Jaap van Marle, eds., *Yearbook of Morphology 2002*, 245–281.

Hyman, Larry, Sharon Inkelas and Galen Sibanda. 1998. Morphosyntactic correspondence in Bantu reduplication. Ms., University of California at Berkeley.

Inkelas, Sharon. 1990. *Prosodic constituency in the lexicon*. New York: Garland.

Inkelas, Sharon. 2008. The dual theory of reduplication. *Linguistics* 46: 351-402.

Inkelas, Sharon and Cheryl Zoll. 2005. *Reduplication: Doubling in Morphology.* Cambridge University Press.

Inkelas, Sharon and Cheryl Zoll. 2007. Is grammar dependence real? A comparison between cophonological and indexed constraint approaches to morphologically conditioned phonology. *Linguistics* 45:133-171.

Kaun, Abigail. 1995. The typology of rounding harmony: an optimality-theoretic approach. PhD dissertation, UCLA.

Kavitskaya, Darya. 1997. Aerodynamic constraints on the production of palatalized trills: the case of the Slavic trilled [r]. In EUROSPEECH-1997, 751-754.

Kawahara, Shigeto. 2007. Copying and spreading in phonological theory: evidence from echo epenthesis. In L. Bateman and A. Werle, eds., *University of Massachusetts Occasional Papers in Linguistics: Papers in Optimality Thoery III.* Amherst, MA: GLSA Publications.

Kim, Yuni. 2002. *Phonological features: privative or equipollent?* AB thesis, Harvard University.

Kitto, Catherine and Paul de Lacy. 1999. Correspondence and epenthetic quality. In Catherine Kitto and Carolyn Smallwood, eds., *Proceedings of AFLA VI*, 181-200. Department of Linguistics, University of Toronto. See also: ROA-337.

Kochetov, Alexei. 2005. Phonetic sources of phonological asymmetries: Russian laterals and rhotics. In C. Gurski, ed., *Proceedings of the 2005 Canadian Linguistics Association Annual Conference.*

Krämer, Martin. 2003. *Vowel harmony and correspondence theory.* Walter de Gruyter.

Lubowicz, Anna. 2003. *Contrast Preservation in Phonological Mappings*. PhD dissertation, University of Massachusetts, Amherst.

Lydall, Jean. 1976. Hamar. In M. L. Bender, ed., *The Non-Semitic Languages of Ethiopia*, 393-438. Michigan.

MacEachern, Margaret. 1999. *Laryngeal Cooccurrence Restrictions*. New York: Garland.

Matthews, P. H. 1972. Huave verb morphology: some comments from a non-tagmemic standpoint. *IJAL* 38: 96-118.

McCarthy, John. 2003. OT constraints are categorical. *Phonology* 20:75-138.

McCarthy, John and Alan Prince. 1993a. Prosodic morphology I: constraint interaction and satisfaction. Ms., UMass Amherst and Rutgers.

McCarthy, John and Alan Prince. 1993b. Generalized alignment. In G. Booij and J. van Marle, eds., *Yearbook of Morphology 1993*, 79-153. Dordrecht: Kluwer.

McCarthy, John and Alan Prince. 1994. The emergence of the unmarked: optimality in prosodic phonology. *Proceedings of NELS 24*, 333-379.

Mester, Armin and Junko Itô. 1989. Feature predictability and underspecification: palatal prosody in Japanese mimetics. *Language* 65: 258-293.

Millán, Saúl. 2003. *Huaves*. Pueblos indígenas del México contemporáneo. Mexico City: Comisión Nacional para el Desarrollo de los Pueblos Indígenas.

Mithun, Marianne and Basri. 1985. The phonology of Selayarese. *Oceanic Linguistics* 25(1/2): 210-254.

Mohanan, K. P. 1991. On the bases of Radical Underspecification. *Natural Language and Linguistic Theory* 9: 285-325.

Mortensen, David. 2006. *Logical and Substantive Scales in Phonology*. PhD dissertation, University of California, Berkeley.

Newman, Stanley. 1944. *Yokuts Language of California*. Viking Fund Publications in Anthropology no. 2. New York: Viking Fund.

Ní Chiosáin, Máire. 1995. Barra Gaelic vowel copy and (non-)constituent spreading. In R. Aranovich, W. Byrne, S. Preuss and M. Senturia, eds., *Proceedings of the 13th West Coast Conference on Formal Linguistics*, 3-15. Stanford: CSLI.

Ní Chiosáin, Máire and Jaye Padgett. 1993. Inherent VPlace. Report no. LRC-93-09, Linguistics Research Center, Department of Linguistics, UC Santa Cruz.

Noyer, Rolf. 1991. Tone and stress in the San Mateo dialect of Huave. *Proceedings of ESCOL 1991*, 277-288.

Noyer, Rolf. 1993. Mobile affixes in Huave: optimality and morphological well-formedness. In E. Duncan, D. Farkas and P. Spaelti, eds., *Proceedings of the Twelfth West Coast Conference on Formal Linguistics*, 67-82. Stanford: CSLI.

Noyer, Rolf. 1997. *Features, positions and affixes in autonomous morphological structure*. New York: Garland.

Noyer, Rolf. 2003. A generative phonology of Huave. Ms., University of Pennsylvania.

Odden, David. 1991. Vowel geometry. *Phonology* 8(2): 261-290.

Ohala, John. 1997. Emergent stops. *Proceedings of the 4th Seoul International Conference in Linguistics*, 84-91.

Ohala, John and Feder. 1994. Listeners' identification of speech sounds is influenced by adjacent "restored" phonemes. *Phonetica* 51: 111-118.

Padgett, Jaye. 1995. Partial class behavior and nasal place assimilation. In K. Suzuki and D. Elzinga, *Proceedings of the 1995 Southwestern Workshop on Optimality Theory*. Tucson: Department of Linguistics, University of Arizona. Also: ROA-113.

Pak, Marjorie. 2007. Phrasal tone domains in San Mateo Huave. *Proceedings of the 33rd Annual Meeting of the Berkeley Linguistics Society.* Berkeley, CA: Berkeley Linguistics Society.

Paster, Mary. 2005. Pulaar verbal extensions and phonologically driven affix order. In G. Booij and J. van Marle, eds., *Yearbook of Morphology 2005*, 155-199. Dordrecht: Springer.

Paster, Mary. 2006. *Phonological conditions on affixation*. PhD dissertation, UC Berkeley.

Pike, Kenneth L. and Milton Warkentin. 1961. Huave: a study in syntactic tone with low lexical functional load. In B. F. Elson and J. Comas, eds., *A William Cameron Townsend en el vigésimoquinto aniversario del Instituto Lingüístico de Verano*, 627-42. Mexico: Instituto Lingüístico de Verano.

Radin, Paul. 1916. On the relationship of Huave and Mixe. *American Anthropologist* 18: 411-423.

Radin, Paul. 1924. The relationship of Maya to Zoque-Huave. *Journal de la Société des Américanistes* XVI: 317-324.

Radin, Paul. 1929. Huave texts. *IJAL* 5:1-56.

Rice, Keren. 2000. *Morpheme Order and Semantic Scope: Word Formation in the Athapaskan Languages*. Cambridge University Press.

Rose, Sharon and Rachel Walker. 2004. A typology of consonant harmony as correspondence. *Language* 80(3): 475-531.

Schane, Sanford A. 1984. The fundamentals of particle phonology. *Phonology Yearbook* 1:129-155.

Schane, Sanford A. 1995. Diphthongization in particle phonology. In J. A. Goldsmith, ed., *The Handbook of Phonological Theory*, 586-608. Blackwell.

Signorini, Italo. 1979. *Los huaves de San Mateo del Mar, Oaxaca*. Colecciòn Presencias 45. Mexico City: Instituto Nacional Indigenista.

Sonnenschein, Aaron Huey. 2005. A descriptive grammar of San Bartolomé Zoogocho Zapotec. Munich: Lincom Europa.

Stairs, Emily and Barbara Hollenbach. 1969. Huave verb morphology. *IJAL* 35: 38-53.

Stairs, Emily and Barbara Hollenbach. 1981. Gramática huave. In G. Stairs and E. Stairs, eds., 283-391. Vocabularios indígenas 24. SIL Mexico.

Stairs, Glenn and Emily Stairs. 1981. *Diccionario huave de San Mateo del Mar*. Vocabularios indígenas 24. SIL Mexico.

Stanley, R. 1967. Redundancy rules in phonology. *Language* 43: 393-436.

Steriade, Donca. 1981. Parameters of metrical vowel harmony rules. Ms., MIT.

Steriade, Donca. 1987. Redundant values. In A. Bosch and E. Schiller, eds., CLS 23(2): 339-62. Chicago Linguistic Society.
Steriade, Donca. 1995. Underspecification and markedness. In J. Goldsmith, ed., *The Handbook of Phonological Theory*, 114-175. Oxford: Blackwell.
Stump, Gregory. 1992. Position classes and morphological theory. In G. Booij and J. van Marle, eds., *Yearbook of Morphology 1992*, 129-180. Dordrecht: Kluwer.
Suarez, Jorge. 1975. *Estudios huaves*. Colección Científica Lingüística 22. Mexico City: Instituto Nacional de Antropología e Historia.
Swadesh, Morris. 1960. The Oto-Manguean hypothesis and Macro-Mixtecan. *IJAL* 26: 79-111.
Ulrich, Charles H. 1994. Diphthongization of short vowels in Lama and elsewhere. In P. Koskinen, ed., *Proceedings of the 1994 Annual Conference of the Canadian Linguistic Association*. Toronto: University of Toronto Department of Linguistics.
Urbanczyk, Suzanne. 1996. Patterns of reduplication in Lushootseed. PhD dissertation, University of Massachusetts, Amherst.
Van Haitsma, Julia and Willard Van Haitsma. 1976. *A hierarchical sketch of Mixe as spoken in San José el Paraiso*. SIL.
Vaux, Bert. 1998. The laryngeal specifications of fricatives. *Linguistic Inquiry* 29(3): 497-511.
Walker, Rachel and Fidèle Mpiranya. 2005. Sibilant harmony in Kinyarwanda and coronal opacity. In R. T. Cover and Y. Kim, eds., *Proceedings of the 31st Annual Meeting of the Berkeley Linguistics Society*, 383-394. Berkeley, CA: Berkeley Linguistics Society.
Warkentin, Milton and Clara Warkentin. 1952. *Vocabulario huave*. Mexico City: Instituto Lingüístico de Verano.
van de Weijer, Jeroen. 1994. *Segmental structure and complex segments*. PhD dissertation, Leiden University.
Wetzels, W. L. and J. Mascaro. 2001. The typology of voicing and devoicing. *Language* 77: 207-244.
Wetzels, L. & W. Sluyters. 1995. Formação de raiz, formação de glide e 'decrowding' fonético em Maxacalí. *Estudos fonológicos das línguas indígenas brasileiras*, 103-149. Rio de Janeiro: Editora UFRJ.
Xu, Zheng. 2007. *Inflectional morphology in Optimality Theory*. PhD dissertation, SUNY Stonybrook.
Yu, Alan. 2005. Toward a typology of compensatory reduplication. In J. Alderete, C. Han and A. Kochetov, eds., *Proceedings of the 24th West Coast Conference on Formal Linguistics*, 397-405. Somerville, MA: Cascadilla.
Yu, Alan. 2007. *A natural history of infixation.* Oxford: OUP.
Zhang, Jie. 2001. The contrast-specificity of positional prominence: evidence from diphthong distribution. Paper presented at the 75th LSA Annual Meeting, Washington, D.C.
Zoll, Cheryl. 1998. *Parsing Below the Segment in a Constraint-Based Framework.* Stanford: CSLI.